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PROJECT ABC: THE IMPACT OF CRS' ADULT EDUCATION AND ABC PROGRAM ON EDUCATION, AGRICULTURE AND MIGRATION

Jenny C. Aker, Tufts University
Christopher Ksoll, Oxford University

EXECUTIVE SUMMARY

This report provides the results of an evaluation of both CRS' adult education program and a mobile phone-based adult education pilot program (Project *Alphabetisation de Base par Cellulaire*, or Project ABC) in Niger. Project ABC was implemented by Catholic Relief Services (CRS) as part of its Multi-Year Assistance Program (MYAP), in collaboration with Tufts and Oxford Universities. The project gave adult participants traditional literacy and math classes as well as basic mobile phone skills in the Dosso and Zinder regions of Niger. Implemented over two years in 140 villages, the project shows that adult education classes can have a significant impact upon adults' learning outcomes, migration and agricultural production. Overall, adult literacy participants achieved a first grade writing level and a second grade math level after eight months of classes. Those in ABC villages learned even more quickly, with writing and math test scores that were 9 to 20 percent higher than those in regular literacy villages. These effects also remained seven months' after the end of classes.

Beyond its impacts on education, Project ABC also had positive effects on household migration, agricultural production and marketing, village associational membership and mobile phone usage. Participants in ABC villages received higher prices (around 1169 FCFA) when selling livestock, although this difference cannot be attributed to the ABC program. Additionally, participants in ABC villages increased the number of family members engaging in off-season migration, an important source of income and means of coping with drought in Niger. Finally, households in ABC villages produced more types of crops and sold more of their cash crop (mainly gombo), thereby earning \$10-\$20 more per year. These results are all the more surprising given that Niger experienced a severe drought in 2009/2010, the period of this project. The reasons for these changes are due to increased involvement in village community life and the use of mobile phones for information on shocks, agricultural production and migration.

CRS FINAL REPORT

I. Project Background

Niger is a landlocked country of 13.9 million people located in the western region of sub-Saharan Africa, covering an area of 1,267,000 km. With a per capita GNP of US\$230 (2004) and an estimated 62.1 percent of the population living below the poverty line, Niger is one of the lowest-ranked countries on the United Nations' Human Development Index (HDI).¹ Approximately 85 percent of the population lives on less than US\$2 per day, with 65 percent of the population living on less than US\$1 per day. Niger also has one of the highest illiteracy rates in the world, with only an estimated 30% of the population having achieved basic literacy.²

Niger's rural populations, particularly those living in the Dosso, Tillabéri and Zinder, suffer from chronic, seasonal and transitory food insecurity. During the final evaluation of CRS/Niger's FY00-FY05 Development Assistance Program (DAP), as well as the development of its FY07-FY11 Multi-Year Assistance Program (MYAP), CRS/Niger identified an important key leverage point that affects all aspects of food insecurity in Niger: low levels of human capital, primarily illiteracy.³ In an effort to address this need, CRS/Niger implemented adult literacy program as part of its Title II-assisted MYAP.

Project ABC was implemented as a two-year pilot program that was integrated into CRS' literacy activities yet funded and evaluated by university partners (Tufts University, Oxford University and University of California-Berkeley). Project ABC:

- 1. Taught participants how to use mobile phones as part of the normal literacy class, thereby allowing adult learners to practice reading and writing in local languages via SMS.**⁴
- 2. Were provided with mobile phones, whereby a group of five students shared one mobile phone.** Students were responsible for charging and paying for the use of the mobile phones.
- 3. Facilitated groups' access to market information via mobile phones, which are part of communities' agroenterprise activities.**

The overall goal and strategic objectives of this pilot project are the same as those of the MYAP. While literacy activities had an impact upon all three Strategic Objectives (SOs), Project ABC is directly linked with the SO1 (increased agro-pastoral production and

¹The UNDP's Human Development Index is based upon a composite indicator of life expectancy, literacy rates and poverty (2008).

² UN Human Development Report, 2009

³ Project ABC Project Proposal.

⁴ This approach is different from the existing information communication technology (ICT) literacy projects, which have either used cell phones to train facilitators, or have developed new software and games for school-aged children (MILLEE, UC-Berkeley).

agroenterprise). To achieve this SO, Project ABC focused on two Intermediate Results (IRs):

1. IR 1.1. Adults (men and women) in rural communities of Doutchi, Loga, Mirriah and Tanout are functionally literate.
2. IR 1.2. Households in the rural communities of Doutchi, Loga, Mirriah and Tanout use market information to buy and sell their agricultural products.

II. IMPLEMENTATION

Between February 2009 and June 2011, Project ABC was implemented by Catholic Relief Services (CRS) in the Dosso and Zinder regions. Of the 140 villages where CRS was working at the time, 110 were randomly selected.⁵ The project was integrated with the MYAP in two ways:

1. The villages for the pilot program were chosen from CRS' MYAP villages. Since over 90 percent of MYAP villages in both regions had mobile phone coverage (93 percent in Dosso and 90 percent in Zinder), mobile phone coverage was not a constraint for this project. Among the 110 MYAP villages with mobile phone coverage, non-mobile phone functional literacy activities were implemented in approximately half of the villages ("non-ABC villages") and mobile phone-based literacy activities were implemented in the other half ("ABC villages"). ABC villages were chosen "at random" in order to permit for a comparison between ABC and non-ABC villages and to ensure equal access to the new program.
2. The pilot program built upon and coordinated with the literacy and agroenterprise activities included in the MYAP.

The details of the literacy classes and ABC project are provided below.

Classes

Adult education classes were held from February to June each year, with breaks from July to January to accommodate agricultural planting and harvesting seasons. Each village had two classes, one of 25 women and one of 25 men, in Dosso and Zinder. This coincides with the benchmarks set by the Education for All (EFA) Initiative, which recommend a ratio of one facilitator for thirty learners.⁶ This also accounts for cultural factors, as socio-cultural practices in Niger necessitate the separation of men and women.⁷ The communities

⁵ Villages without mobile phone coverage and villages with existing adult literacy programs were deemed ineligible and were not included in the randomized selection.

⁶ Education for All 2005. *International Benchmarks for Adult Literacy*. CRS and its partners, in collaboration with the community, will develop clear criteria to choose the literacy participants.

⁷ The Government of Niger's non-formal education protocol for adult literacy states the following: 1) courses in rural areas should occur between January-June of each year, after the primary harvest and before the planting season; 2) courses should occur for 600 hours over a two-year period in order to achieve functional literacy; and 3)

discussed the time of day during which the classes were offered; men's classes often met at night while women's classes often met in the late morning or mid-afternoon.

As demand exceeded the number of spaces, students were selected by a public lottery held in each village. The eligibility criteria included: 1) membership in a formal or informal village producers' association; 2) the inability to read or write in any language; and 3) a willingness to participate in the program. Eligible applicants comprised over half the adult village population in most villages. Students received a food incentive to attend the literacy program, including 100 kg bag of grain per month for each month of the program.

Teachers

In order to recruit teachers, the Ministry of Non-Formal Education visited each village to find candidates that had several years of formal education. If there were no such candidates, the Ministry looked in nearby villages, cities or towns. Candidates went through two to three weeks of teacher training to learn the adult literacy teaching methodology and course curriculum. At the end of the training, the candidates had to pass a test. Teachers were compensated with food and cash. Teacher recruitment took place both in 2009 and 2010, so the composition of teachers was slightly different each year.

Curriculum

Both ABC and non-ABC villages used the same literacy and numeracy curriculum to teach student functional literacy and numeracy in Hausa and Zarma. The focus on indigenous languages is a priority of the Ministry of Non-Formal Education. This coincides with other best practices and lessons learned for adult education programs in Africa, which suggest that adult education should start with local languages first (Oxfam 2007). Teaching in Hausa and Zarma also facilitated the ABC module of the program, as both languages are primarily phonetic and well-adapted to SMS. Each village selected the language of instruction that the most useful and common in their location, although not necessarily their native language.⁸

ABC Curriculum

The ABC curriculum was a mobile phone-based adult education curriculum that was directly integrated into CRS' adult education activities. Three months into the adult education classes, a mobile phone skills module was introduced into the curriculum for ABC villages. The ABC module consisted of two primary components: 1) students learned how to use the mobile phone, e.g., turning the phone on and off, recognizing numbers and

courses should be conducted in sequence so that participants are learning new material during the second year. Government of Niger (2008). *Projet de Politique Nationale d'Alphabétisation et d'Education Non-Formelle*.

⁸ There are almost 10 local languages spoken in Niger, but Hausa, Zarma and Kanuri are the primary regional languages for Dosso and Zinder. The students in Kanuri villages (4 percent of all students) opted to learn in Hausa, rather than Kanuri.

letters on the screen and keypad, making a call and writing and sending an SMS; and 2) Mobile phones were distributed to groups of five students in ABC villages. Teachers in ABC villages also participated in a one-day training on how to “teach” the mobile phone. Students in the ABC classes did not have any additional time in class, so the module was adapted to fit inside normal class hours. An additional element of this program was building associations’ capacity to access market information and to use this market information to make decisions about when, where and how to sell agricultural products.

III. DATA

A. Impact Evaluation

In order to assess the impact of the mobile-phone based literacy activities and compare its impact with “traditional” literacy programs, CRS, in collaboration with Tufts and Oxford Universities, used an impact evaluation approach. This involved comparing both education and other livelihood outcomes of participants in ABC villages (“treatment” or “intervention” group) with those in non-ABC villages (“comparison” or non-intervention group). Data were therefore collected both before and after (pre/post) and all villages. Villages were randomly assigned to the ABC program in order to ensure equal access to the program and ensure that there were no systematic difference between the ABC and non-ABC groups prior to the program.⁹

Using the impact evaluation approach, Project ABC contributes to determining whether mobile phones are a more effective and cost-efficient means of teaching literacy/numeracy to adults than traditional methods. It additionally has provided CRS and partner universities the opportunity to look at Project ABC’s effect on household well-being, including livestock marketing and migration practices.

B. DATA

Literacy and numeracy data

Literacy and numeracy tests were administered to all 50 students in each village prior to the start of courses in January 2009, providing a baseline sample of over 5,000 students for the 2009 and 2010 classes. Follow-up tests were administered with the 2009 group in June 2009 and with both groups in June 2010 to estimate the immediate impact of the program. The exams were designed by Catholic Relief Services and Tufts University, in collaboration with Niger’s Ministry of Non-Formal Education. Each test was graded on a scale of 0 to 6 and the test format and levels were consistent across the Hausa and Zarma tests for each round.¹⁰ A score of 0 on a literacy test indicated that the person was completely illiterate (unable to recognize any letters or numbers), whereas a score of 6 signaled that the student had mastered basic reading and writing skills (measured by the ability to write two

⁹ Half of the villages (55) were chosen to begin literacy classes in 2009, and half of those villages (26) were randomly assigned to participate in the ABC program. The same process was carried out for the 2010 group.

¹⁰ Please see Appendix 1 for test examples.

complete sentences with complex word patterns). For math, a score of 0 also indicated no number recognition, whereas a score of 6 meant the individual could solve math word problems involving addition, subtraction, multiplication and division.

In addition to the June tests, Tufts and Oxford Universities also administered tests in January 2010 and January 2011 to all students, seven months after the end of classes. The comparison of the June and January test results shows the retention rates due to continued mobile phone use. Overall, the literacy and numeracy data are used to measure the impact of the program on students' learning.

Household and village-level data

A household and village-level baseline study in 100 villages was jointly conducted in December 2008/January 2009 by the CRS/Niger and Tufts and Oxford University. The survey collected data on a variety of subjects, such as agricultural production and marketing; livestock marketing; migration; and knowledge of the topics taught in the literacy program. The sample size includes 1,100 households for each round. Similar surveys were conducted in January 2010 and January 2011 by Tufts and Oxford Universities. Overall, these data are used to measure the impact of the adult education classes and the ABC module on different outcomes.

IV. DID THE ADULT EDUCATION PROGRAM AND PROJECT ABC IMPROVE ADULT LEARNING?¹¹

Students in ABC villages achieved additional literacy and numeracy gains, with test scores 9 to 20 percent higher than those in non-ABC villages. The program had longer-term impacts as well: 7 months after the end of classes, writing and math test scores were still higher in ABC villages. The differences in ABC and non-ABC outcomes show that mobile phones are effective as a motivational and educational tool for adult education for rural populations.

Project ABC also provided the opportunity to assess the impact of specific teacher characteristics – age, gender, local status and years of education – on Project ABC outcomes. Results show that it was better for female students to have female teachers and the same for males. Also, younger teachers are better at teaching the ABC literacy component and older teachers are better at teaching math. Local teachers get better results, as do teachers with at least seven years of formal education.

A. Short-Term Impacts of the Adult Education and ABC Program

Table 1 compares the writing and math test scores of students in ABC and non-ABC villages overall and by each region during the first year (5 months) and second year (17 months) of

¹¹Results for this section can be found in greater detail in Jenny Aker, Christopher Ksoll and Travis J. Lybbert's paper *ABC, 123: Can Mobile Phones Improve Learning? Evidence from a Field Experiment in Niger* (forthcoming) and Rebecca Schutte's paper *Effects of Teacher Characteristics on Project ABC Outcomes in Niger* (available on request).

the program. Overall, students in CRS' adult education programs demonstrated substantial improvements in writing and math scores. Before the program started, students were near Level 0, meaning that they were unable to recognize any letters or numbers. This was the case overall, as well as in the Dosso and Zinder regions.

After the first year of the program, students in non-ABC villages obtained a writing score of 1.57 (out of 6) and a math score of 2.19 (out of 6). However, the test scores in ABC villages were higher: Overall, math test scores were .31 points (19 percent) higher in ABC villages, and math test scores were .23 points (11 percent) higher in ABC villages, with a *statistically significant difference* between the two.¹²

Table 1: Test Scores for ABC and Non-ABC Villages

	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC - Non- ABC	Significant difference?
Baseline writing test score	0.03	0.04	-.01	No
Baseline math test score	0.04	0.06	-.02	No
First year writing test score	1.88	1.57	.31	Yes
First year math test score	2.41	2.19	.23	Yes
Second year writing test score	2.32	2.11	.21	Yes
Second year math test score	3.13	2.78	.35	Yes
DOSSO				
Baseline writing test score	0.03	0.04	0	No
Baseline math test score	0.05	0.07	-.02	No
First year writing test score	1.70	1.35	0.35	Yes
First year math test score	2.48	2.13	0.35	Yes
Second year writing test score	2.37	1.91	0.46	Yes
Second year math test score	3.33	2.77	0.56	Yes
ZINDER				
Baseline writing test score	0.03	0.04	-0.01	No
Baseline math test score	0.03	0.05	-0.02	No
First year writing test score	2.10	1.88	0.22	Yes
First year math test score	2.33	2.27	0.06	No
Second year writing test score	2.25	2.40	-0.15	No
Second year math test score	2.89	2.79	0.1	No

After the second year of classes (for the 2009 cohort), students in non-ABC villages achieved an average writing score of 2.11 and an average math score of 2.78. This suggests that CRS' adult education program helped adult students achieve the equivalent of a first-grade writing and a second-grade math level after eight months of classes over a two-year period.

¹² Statistical significance implies that the measured differences are due to the ABC program and not due to other factors.

Similar to the first year of classes, the results from the second year show that writing test scores were .21 points (9 percent) higher and math test scores were .35 points (12 percent) higher in ABC villages, with a statistically significant difference between the two. This results show that overall CRS' adult education program was successful in improving adults' learning, and that the ABC program improved learning by 9-20 percent.

Impacts by Region

As **Table 1** shows, the program had different effects in each region. During the first year of the program, writing test scores for non-ABC villages were 1.35 for Dosso and 1.88 for Zinder, respectively, meaning that Zinder had higher writing test scores. Math test scores were also higher in Zinder after the first year, with a score of 2.13 in Dosso and 2.27 in Zinder. While both regions improved the test scores of students, the ABC program had a stronger effect in the Dosso region: ABC writing and math test scores were .35 higher in Dosso (16-26 percent higher), with a statistically significant difference between the two. For Zinder, writing test scores were .22 points (12 percent) higher, and math test scores were .06 points higher – but there is only a difference for writing test scores.

During the second year of the program (17 month test scores), both writing and math test scores were higher in Zinder as compared to Dosso. However, the impact of the ABC program was stronger in the Dosso region, increasing test scores by .46 for writing and .56 for math, respectively. In Zinder, the ABC program did not appear to increase test scores during the second year.

Overall, the results show that the adult education program increased writing and math test scores in both Dosso and Zinder, with higher test scores in Zinder for both years. The ABC program resulted in even higher test scores by 12-26 percent, but this effect was mainly in Dosso for both years and in Zinder for the first year.

Additional test score results by village are provided in Appendix 1.

Impacts by Gender

Table 2 shows the test scores for male and female students for both ABC and non-ABC villages. Overall, both men and women were illiterate and innumerate before the program, although men had relatively higher writing and math test scores before the program. After the first year of the program, women's writing test scores improved to 1.12 in non-ABC villages, whereas men's test scores improved to 2.05, almost a level higher. The same was true for math test scores; men's math scores were 2.53 whereas women's math test scores were 1.86. The relatively lower test scores for women could be due to several factors, such as: 1) women often bring their children to class and must care for them; 2) women have fewer opportunities to study or practice their literacy and numeracy skills outside of the classroom; and 3) some teachers in women's classes were men. Nevertheless, despite these differences, the test scores in ABC villages were 6-27 percent higher for both men

and women, with a statistically significant difference between the two for writing and math test scores. There were similar effects for the second year of the program.

Table 2: Test Scores for Men and Women in ABC and Non-ABC Villages

Women	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC - Non- ABC	Significant difference?
Baseline writing test score	0.03 (.19)	0.04 (.22)	-0.01	No
Baseline math test score	0.03(.21)	0.04 (.23)	-0.01	No
First year writing test score	1.43 (1.54)	1.12 (1.75)	0.31	Yes
First year math test score	2.14 (1.54)	1.86 (1.32)	0.27	Yes
Second year writing test score	1.57 (1.74)	1.43 (1.63)	0.13	No
Second year math test score	2.72 (1.62)	2.40 (1.51)	0.32	Yes
Men	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC - Non- ABC	Significant difference?
Baseline writing test score	0.04 (.23)	0.04 (.25)	0	No
Baseline math test score	0.06(.29)	0.08(.31)	0	No
First year writing test score	2.34 (1.95)	2.05(1.83)	0.29	Yes
First year math test score	2.69 (1.44)	2.53 (1.44)	0.16	Yes
Second year writing test score	3.09 (2.29)	2.85 (2.20)	0.23	Yes
Second year math test score	3.54(1.73)	3.18(1.65)	0.36	Yes

Table 3 shows the same results for women by region and by ABC or non-ABC program.

Table 3: Test Scores for Women by Region

DOSSO	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC - Non- ABC	Significant difference?
Baseline writing test score	0.04 (.22)	0.03 (.34)	0	No
Baseline math test score	0.05 (.24)	0.04 (.35)	0.01	No
First year writing test score	1.24 (1.48)	0.77 (1.24)	0.47	Yes
First year math test score	2.21 (1.46)	1.64 (1.25)	0.56	Yes
Second year writing test score	1.72 (1.53)	1.34 (1.32)	0.38	Yes
Second year math test score	2.52 (1.60)	2.13 (1.35)	0.39	Yes
ZINDER	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC - Non- ABC	Significant difference?
Baseline writing test score	0.02 (.15)	0.06 (.33)	-0.04	Yes
Baseline math test score	0.02 (.15)	0.06 (.33)	-0.04	Yes
First year writing test score	2.26 (1.60)	1.98 (1.66)	0.28	Yes
First year math test score	2.39 (1.50)	2.12 (1.54)	0.27	Yes

Second year writing test score	1.43 (1.56)	1.51 (1.37)	-0.08	No
Second year math test score	2.19 (1.22)	2.31 (1.27)	-0.12	Yes

Impact of the Program by Teacher Characteristics (Gender, Age and Education)

Teacher Characteristics

Overall, the success of the students is partly, if not entirely, determined by the quality of the teacher. As part of the program, CRS and Tufts University collected data on teacher characteristics, such as gender, age, education level and village of origin (ie, whether a “local” teacher or not). Table 4 shows teacher characteristics in ABC and non-ABC villages for each year (2009 and 2010). Adult education teachers had 8.5 years of education (ranging from literacy training to 13 years of education), were 32 years old, primarily male and mainly from the village of origin, especially in the Dosso region. Table 4 also shows that there were not any differences in teacher quality between ABC and non-ABC villages, which means that measured differences in test scores between ABC and non-ABC cannot be due to differences in teacher quality.

Table 4: Teacher Characteristics in ABC and non-ABC Villages

	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC - Non- ABC	Significant difference?
Number of years of education	8.91 (.35)	8.31 (.30)	0.6	No
Age	32.45 yrs (1.6)	32.53 yrs (1.2)	-.08	No
Gender	32% women (9%)	25% women (6%)	6%	No
Local	67% local (.1)	74% local (.1)	-7%	No
2010	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC - Non- ABC	Significant difference?
Number of years of education	8.32 (.3)	8.28 (.2)	.04	No
Age	32.75 yrs (1.2)	33.28 yrs (.8)	-.53	No
Gender	40% women (.1)	35% women (0)	5%	No
Local	70% local (.1)	74% local (.0)	-4%	No

Impact by Age, Education and Local Status

Table 5 shows test scores by teacher age, level of education and whether they are from the village. In general, older teachers increase students’ test scores, but this effect is small: As teachers get older by one more year, this increases students’ writing and math test scores by .042 points (less than 3.8 percent). This effect gets even smaller as teachers get older. The ideal age range for math and literacy teachers is 39-41 years of age. For the ABC program, slightly younger teachers improve test scores. This could be explained by the fact

Table 5: Effect of teacher age, education and "local" status on test scores

LITERACY	Effect on Test Scores	Significant?	Interpretation
Teacher age	.11	Yes	Test scores increase as teacher age increase
Teacher age*teacher age	-0.001	Yes	But diminish past a certain age
Teacher education	.04	No	One year of additional education increases students' writing scores by .042 points but no significant effect
Local teacher (Zinder only)	-0.15	No	Whether a teacher is local or not has no effect on test scores
MATH	Effect on Test Scores	Significant?	Interpretation
Teacher age	.066	Yes	Test scores increase as teacher age increase
Teacher age*teacher age	-0.000	No	But diminish past a certain age
Teacher education	0.05	No	One more year of teacher education increases students' math scores by .05 points but no significant effect
Local teacher (Zinder only)	0.07	No	Whether a teacher is local or not has no effect on test scores

that younger teachers are more familiar with technology and older teachers are more comfortable with teaching in traditional methods.

In terms of teacher education levels, the level has little impact on students' test scores. In general, for every additional year of education, this increases students' test scores by .05 points – less than 4 percent. This suggests that while years of education might be an important factor, it is not the most important factor for adult learning.

Finally, if the teacher is not from the village (“local” status, which is only applicable in Zinder) is associated with lower test scores, although this effect is not statistically significant. This is primarily the case for the Zinder region: This is correlated with the fact that Dosso had 97 percent local teachers, whereas Zinder only had 40 percent.

B. Longer-Term Impacts of the Adult Education and ABC Program

One of the main criticisms of adult education programs is the loss of skills after the program ends. By using the January 2010 and January 2011 test scores – which were administered after the first year of the program – it is possible to see how much test scores dropped after the end of classes. Table 7 shows the results. Seven months after classes, overall test scores fell by 10-25 percent for math and writing test scores as compared to those right after the program. While test scores in ABC classes fell as well, they were still 10-20 percent higher than test scores in non-ABC villages, suggesting that the ABC program

is more effective for helping students retain information. While test scores in the Dosso and Zinder regions were similar seven months after the program, the effect of the ABC program on sustained learning was stronger the Dosso region. In addition, students retained math skills more effectively than literacy, perhaps because there are more everyday applied uses for math including buying and selling at the market, commerce, or trade.

Table 6. Longer-Term Impacts of the Adult Education and ABC Program

ALL	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC-Non-ABC	Statistically significant?
Writing test score	1.44(1.92)	1.22 (1.73)	.21	Yes
Math test score	2.34(1.80)	2.14 (1.69)	0.2	Yes
DOSSO	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC-Non-ABC	Statistically significant?
Writing test score	1.36 (1.86)	.95 (1.51)	.40	Yes
Math test score	2.5 (1.78)	2.15 (1.60)	0.35	Yes
ZINDER	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC-Non-ABC	Statistically significant?
Writing test score	1.52 (1.99)	1.60 (1.96)	.08	No
Math test score	2.14 (1.81)	2.11 (1.81)	0.03	No

C. Is the ABC Program Cost Effective?

The Government of Niger has scarce resources to spend on education, and investing in adult mobile phone education programs is one possible option. But how does it stack up to other potential interventions in terms of cost effectiveness? To answer this question, a cost effectiveness test was done to compare the cost per student in the program versus the impact on educational outcomes. This was then compared to other educational programs which have been tested in various countries to see what gives the most impact per amount of money spent.

The cost of the basic literacy program per student (e.g., the cost of the program in a non-ABC village) is \$18.35 for 2 years of classes. By comparison, the cost for each student in an ABC village is \$21.30. Thus, for \$2.95 more per student, one could increase scores by 0.17 and 0.25 standard deviations for literacy and math respectively. For every extra \$1.50 spent on the ABC program, the standard deviation of the scores increase by 0.10.

Conclusion

Given the higher scores for ABC students both in the short and medium term by 9 to 20 percent, mobile phones seem to be a simple, low cost method to improve adult education outcomes in rural Niger. Since any simple mobile phone can be used and special applications or smart phones are not required, the project is easily scalable and replicable

in other countries or regions of Niger. However, selected intervention areas must have mobile phone service and reasonable voice and SMS prices. The project also may not be as effective for languages with widely available materials such as English or French or those not learning in their native language (like Kanuri students in Project ABC).

V. DID THE LITERACY AND ABC PROGRAM HAVE AN IMPACT UPON OTHER OUTCOMES?

Participating in an adult education class can have other impacts on people's lives other than on test scores. Improved education can allow households to better access agriculture, price, health and migration information, make better choices and improve their income sources and revenues from agricultural marketing. This section measures the impact of the adult education program, and the ABC component, on different measures of well-being.

A. Comparison of ABC and non-ABC Villages before the Program

Table 7 shows that households in ABC and non-ABC villages were similar before the start of the program. The average household size was 8 people. Children's educational achievements were low: less than 10 percent of children aged 7 to 15 had ever attended primary school. Thirty percent of households in the sample owned a mobile phone prior to the start of the program, with 80 percent having access to a mobile phone within the village. Over 50 percent of respondents had used a mobile phone in the few months prior to the baseline, although almost exclusively for receiving calls. Since there is not a "statistically significant" difference between ABC and non-ABC villages *before the program*, then any differences between the two groups observed *after the program* can largely be attributed to Project ABC, and not other factors.

Table 7: Baseline Household Descriptive Statistics

	ABC Mean	Non-ABC Mean	Difference ABC-non-ABC	Significant difference?
Age of literacy student	37.9 years	37.2 years	0.69 (.77)	No
Head of Household (1=Yes, 0=No)	56%	55%	1% (.03)	No
Farmer is respondent's main occupation	80%	79%	1% (.03)	No
Number of household members	8.42	8.33	0.09 (.25)	No
% Children <15 with some primary education	10%	9%	1% (.01)	No
Number of asset categories owned	4.97	4.99	-0.01 (.11)	No
Own mobile phone (1=Yes, 0=No)	30%	30%	0.0 (.03)	No
Respondent has access to mobile phone	79%	76%	3% (.02)	No
Household experienced a drought in past year	61%	64%	-3% (.06)	No
# of livestock categories owned by HH	3.18	3.12	.06 (.11)	No
Respondent member of a farmers' association	41%	36%	5% (.05)	No
Used mobile to talk about trade in Niger	9%	11%	-1.4% (.03)	No

HH received NGO agriculture marketing training	4%	3%	1% (.02)	No
HH has sold livestock since the rainy season	60%	56%	4% (.04)	No
Livestock a source of HH revenue	91%	91%	0 (.02)	No

B. Livestock Marketing

Table 8 shows the impact of the ABC program on livestock raising and marketing. Overall, 95% of households in the Dosso and Zinder regions depend upon livestock as a source of income. They own 3 types of different livestock categories, primarily goats (83%), poultry (77%) and sheep (66%). A fewer number of households own cows (56%), donkeys (33%) and camels (2%). Overall, 72% of households sold the livestock since the last harvest, and households in ABC villages were more likely to sell their livestock. Households in ABC villages received higher prices for their livestock (39000 CFA as compared with 33,000 CFA). This means that the ABC program seems to be having an effect on households' livestock sales, but there could also be other factors explaining the effect.

Table 8. Livestock Raising and Marketing

	ABC Mean	Non-ABC Mean	Difference ABC-Non-ABC	Significant difference?
Livestock is a source of household revenue	94%	95%	-1%	No
Number of livestock categories owned	3.05	3.02	.03	No
Household did embouche	62%	55%	7%	No
Household sold animals	73%	65%	8%	Yes
Price (CFA) of animal sold for last transaction	39785	33242	6543	No
Followed animal prices before selling	70%	72%	-2%	No
Sales price - market price at time of sale (FCFA)	2283	2219	64	No

C. Migration

Off-seasonal migration is an important strategy that households use to generate additional income. Before the start of the adult education program, 43 percent of households in Zinder and Dosso regions had a household member who migrated, both within Niger and within North and West Africa. Approximately .67 household members migrated, representing 8 percent of household members and 20 percent of household members over the age of 15 years.

Table 9 shows the effects of the adult education and ABC program on seasonal migration. While migration did not increase overall in the region, migration increased in the ABC villages. Households in ABC villages were 5 percentage points more likely to have a household member migrate, and had more household members migrate. This meant that households in ABC villages were more likely to receive remittances as a source of income,

and received 5000 CFA more for their last transfer. The effects of the ABC program on migration are stronger in Dosso than in Zinder, possibly because of Dosso's proximity to Benin and Nigeria as migration destinations.

Table 9: Migration in ABC and non-ABC Villages

ALL	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC-Non- ABC	Significant difference?
One member in household migrated	48%	43%	5.0%	Yes
Number of household members who migrated	0.74	0.67	0.07	Yes
Percentage of household members who migrated	8.2%	6.7%	1.5%	Yes
Percentage of active household members who migrated	19%	16%	3%	Yes
One member of household migrated within West Africa	20%	10%	10%	Yes
Household received remittance as source of income	20%	17%	3%	No
Amount of last remittance received from migrant (CFA)	31364	25835	5528	No
DOSSO	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC-Non- ABC	Significant difference?
One member in household migrated	62%	47%	15.0%	Yes
Number of household members who migrated	1.09	0.77	0.32	Yes
Percentage of household members who migrated	11.0%	7.0%	3.8%	Yes
Percentage of active household members who migrated	25%	16%	8.3%	Yes
One member of household migrated within West Africa	30%	15%	15%	Yes
Household received remittance as source of income	25%	18%	7%	No
Amount of last remittance received from migrant (CFA)	25760	15319	10440	No
ZINDER	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC-Non- ABC	Significant difference?
One member in household migrated	35%	39%	-4.0%	No
Number of household members who migrated	0.42	0.55	0.13	No
Percentage of household members who migrated	6.0%	6.0%	0.0%	No
Percentage of active household members who migrated	14%	15%	-1%	No
One member of household migrated within West Africa	3%	3%	0%	No
Household received remittance as source of income	15%	16%	-1%	No
Amount of last remittance received from migrant (CFA)	37263	35300	1963	No

C. AGRICULTURAL PRODUCTION AND MARKETING

Agricultural Production

Adult education programs could have an impact upon households' well-being by enabling them to obtain access to planting and price information, use this information to decide what to plant, produce and sell and possibly have an impact upon households' incomes. Table 10 shows the results of the ABC program (not the adult education program) on

agricultural production. (Note: It is important to note that these data coincide with the drought of 2009 and the 2009/2010 food crisis).

Table 10: Agricultural Production

AGRICULTURAL PRODUCTION	Before ABC Mean (s.d.)	Before Non-ABC Mean (s.d.)	After ABC Mean (s.d.)	After Non-ABC Mean (s.d.)	Change over time for non-ABC Group	Difference ABC-Non-ABC	Significant difference?
Number of agricultural products cultivated	5.5	5.6	6.68	6.63	1.02***	0.425	Yes
Household cultivated millet	99%	100%	100%	100%	0%	0%	No
Household cultivated sorghum	78.0%	79.0%	92.0%	89.0%	10.8%***	4.3%	No
Household cultivated cowpea	95%	94%	99%	99%	4.7%***	3.2%	No
Household cultivated oseille	66%	68%	86%	83%	16.6%***	8%	Yes
Household cultivated peanut	55%	57%	77%	79%	21%***	4.5%	No
Household cultivated gombo	55%	61%	80%	77%	21.5%***	15%	Yes
Quantity millet produced (kg)	1129	1234	873	843	-244***	65	No
Quantity sorghum produced (kg)	178	135	100	85	-53***	-36	No
Quantity cowpea produced (kg)	201	211	87	97	-121***	10.5	No
Quantity oseille produced (kg)	87	62	40	36	-40***	24.3	No
Quantity peanut produced (kg)	327	332	374	397	-50**	-0.012	No
Quantity gombo produced (kg)	28	33	380	389	-16***	10.6	Yes

Overall, it is important to note that the adult education program on its own did not have a strong effect on agricultural production. However, the ABC program appeared to increase *the diversity of crops grown* by households in the Dosso and Zinder regions. Table 10 shows the impact of the ABC program on households' agricultural production. While non-ABC households increased the number of crops grown between 2009 and 2010, ABC households grew .425 more crops than non-ABC households. This increase was not due to changes in staple food or cash crops, but rather to less "traditional" cash crops, such as oseille and gombo.

While households produced more crops, there was not a strong difference in the quantity produced, except for gombo. This is partly due to the severe drought in 2009, which had a strong negative impact on agricultural production, especially in Zinder. There was a strong decline in the quantity of crops grown in non-ABC villages between 2009 and 2010. However, the decline was not as strong in ABC villages – households in ABC villages produced more millet, cowpea, oseille and gombo as compared to those in non-ABC villages, although only the effect on gombo production is statistically significant. This could be partly due to the use of mobile phones to obtain information on shocks or price information, as gombo is a cash crop.

Agricultural Marketing

Table 11: Agricultural Marketing

AGRICULTURAL MARKETING	Before ABC Mean (s.d.)	Before Non-ABC Mean (s.d.)	After ABC Mean (s.d.)	After Non-ABC Mean (s.d.)	Change over time for non-ABC Group	Difference ABC-Non-ABC	Significant difference?
Number of crops categories sold	1.74	2.01	1.48	1.58	-0.32***	0.123	No
Household sold millet	35%	36%	42%	37%	6.9%***	3%	No
Household sold sorghum	7.0%	7.0%	7.7%	7.9%	1.4%	0.8%	No
Household sold cowpea	62.0%	70.0%	33.0%	36.0%	-29%***	-0.6%	No
Household sold oseille	12%	13%	9%	9%	-3.8%**	4%	No
Household sold peanut	26%	29%	23%	27%	-3%	3.3%	No
Household sold gombo	13%	17%	10%	10%	-5.4%**	7%	Yes
Quantity millet sold (kg)	192	185	131	125	-40	-0.38	No
Quantity sorghum sold (kg)	65	63	46	68	0.003	-0.1	No
Quantity cowpea sold (kg)	164	161	139	137	-26	-4.6	No
Quantity oseille sold (kg)	110	78	72	67	-21	-22	No
Quantity peanut sold (kg)	373	350	332	410	26	-2	No
Quantity gombo sold (kg)	36	24	16	12	-13	14	Yes

Table 11 shows the impact of the program on households' agricultural marketing and sales. Similar to the results on agricultural production, there was a strong decline agricultural sales between 2009 and 2010 for non-ABC households, primarily due to the drought. Overall, households in ABC villages sold more cash crops than those in non-ABC villages, and sold 14kg more *gombo* than those in non-ABC households. During this period, the farm-gate price for *gombo* (per tia) ranged from 800-1600 CFA. This means that ABC households would have earned an additional \$10-20 per year from *gombo* sales, representing 5 percent of per capita household income.

VI. HOW DID THE ABC PROGRAM AFFECT VILLAGE MEMBERSHIP AND MOBILE PHONE USAGE?

There are several potential reasons for the improvements in agricultural production, sales and migration observed in ABC villages. These include greater involvement in the associational life of the village and increased access to information on prices, agricultural production and labor market information via mobile phones.

Membership in Village Associations

Table 12 shows the impact of the ABC program on village association membership after the program. While association membership was the same before the program started across ABC and non-ABC villages (not shown), the level of associational membership was 6%

higher in ABC villages after the program. This was primarily due to increased membership in women's groups and the CVD.

Table 12: Membership in Associations

ALL	ABC Mean (s.d.)	Non-ABC Mean (s.d.)	Difference ABC-Non-ABC	Significant difference?
Member of a household-level association	85%	79%	6.0%	Yes
Member of a women's group	46%	38%	8%	Yes
Member of a savings group	20.0%	23.0%	-3.0%	No
Member of a farmers' association	26%	31%	-5%	No
Member of a youth group	8%	15%	-7%	Yes
Member of the CVD	49%	47%	2%	No

Mobile Phone Ownership and Usage

After one year of Project ABC, those in ABC villages were found to write and receive SMS, receive "beeps," and transfer credit via mobile phone more than those in Non-ABC villages. Those in ABC villages had also communicated with friends and family in Niger and migrant household members more often than those in non-ABC villages. Cell phone ownership, access and overall usage in ABC and non-ABC villages were found to be equal. There were also no differences in remittances found.

Table 13: Mobile phone usage

	ABC Mean	Non-ABC Mean	Difference ABC-Non-ABC	Statistically significant difference?
<i>Mobile Phone Ownership</i>				
Household owns a mobile phone	46.0%	41.8%	5.0%	No
Number of mobile phones owned	1.24	1.27	-0.03	No
Student is owner of mobile phone	40.1%	40.3%	-0.2%	No
Respondent has access to a mobile phone	95.8%	93.3%	2.5%	Yes
<i>Mobile Phone Usage</i>				
Used mobile phone since last harvest	74.2%	67.7%	6.5%	Yes
Make call	80.0%	73.0%	7.0%	Yes
Receive call	90.0%	89.0%	1.0%	No
Wrote SMS	13.20%	2.80%	10.40%	Yes
Received SMS	14.4%	8.4%	6.0%	Yes
Beeped someone	34.0%	30.0%	4.0%	No
Receive a beep	31.0%	20.0%	11.0%	Yes
Ask price via SMS	4.6%	1.6%	3.0%	Yes
Receive price via SMS	1.1%	4.0%	3.9%	Yes
<i>Reasons for Mobile Phone Usage</i>				

Talk to migrant	34.6%	33.3%	1.3%	No
Talk to friends/family within Niger	80.0%	75.0%	5.0%	No
Talk trade within Niger	12.1%	8.3%	3.8%	No
Talk to friends/family outside Niger	49.0%	43.8%	5.2%	No

VII. CONCLUSION/FINAL SUMMARY

Overall, CRS' adult education program was successful in improving students' human capital, allowing students to achieve a first-grade writing level and second-grade math level after eight months of courses. On average, students in Zinder had higher test scores.

The achievements among ABC students was even higher, with test scores that were 10-26 higher as compared with those in non-ABC villages. The impact of the ABC program was strongest in the Dosso region, possibly because of density of markets and the relatively higher impact of the 2009/2010 drought in the Zinder region.

The ABC program also led to additional benefits in other areas, namely, seasonal migration, agricultural production and marketing.

Project ABC improved human capital through literacy and mobile phone trainings which increase access to information and help program participants continue to better retain skills after classes are finished. This pilot project helped underline specific features that were successful and that may need to change in order to implement a larger project, especially as pertains to teacher qualities.

The ABC lessons additionally contributed to participants' economic well-being, helping them access market prices more quickly and give valuable information before traveling to markets to sell agricultural products or livestock. Similarly, having access to and being able to use cell phones allows participants to contact friends and family in migration destinations to learn whether investing in traveling to these places is worth their time and money. The literacy and economic results of the project have, as proposed, contributed to MYAP's SO1 (increased agro-pastoral production and agroenterprise) through the two IRs targeting literacy and agroenterprise development.

Finally, the low cost per participant of this project makes it a feasible and effective alternative to traditional literacy classes which have been found to be less effective for retaining information in the months and years after classes end.