The impact of ASSP four-year intervention to increase access to family planning services on modern contraceptive use in three regions of the Democratic Republic of Congo

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Introduction

Expanding access to family planning services is the primary objective of global family planning efforts and has been a driving force behind family planning programs in recent years. After the London Summit in 2012, the goal of "expanding access to family planning information, services, and supplies to an additional 120 million women and girls in the world's poorest countries by 2020" became prominent in the family planning global community (FP2020, 2013 Choi et al, 2016). The Democratic Republic of Congo (DRC) is among the countries with the highest fertility rates and lowest levels of modern contraceptive use in Sub-Saharan Africa. The DRC has the third highest fertility rate worldwide, with 6.6 births per woman (DHS 2013-14). Fertility varies from 5.4 children per woman in urban areas to 7.3 in rural areas. Modern contraceptive use among all women of reproductive age differs among 26 different provinces, ranging from 1.4 percent in Sankuru province (formerly part of Kasai-Oriental) to 16.0 percent in Kongo Central (formerly Bas Congo) (DHS 2013-14). The most recent estimates in the city of Kinshasa showed the modern contraceptive prevalence rate (MCPR) to be 22.0 percent among all women in reproductive age (PMA2020, 2018).

In an effort to strengthen the health system and assist the Congolese government in improving the delivery of family planning services in the DRC, IMA World Health and local partners implemented the *Accès aux Soins de Santé Primaires (*ASSP) project between 2013 and 2018 with the funding from Department for International Development (DFID), UK. Consistent with this priority, the ASSP project supports family planning as part of a package of integrated health services, including malaria, nutrition, antenatal care, immunization, and child health. Family planning and maternal health services are highly complementary and often provided together in low and middle-income country settings. During the intervention period, ASSP provided a set of interventions focusing on increasing access to contraceptive services. These services consisted of supporting family planning service delivery in general reference hospitals, reference health centers, and other health centers in the intervention areas. In addition to facility-based interventions, community-based distribution of certain family planning methods such as pills, condoms, and cyclebeads was conducted. The ASSP project also provided facilities with family planning methods including IUDs, implants (Implanon NXT, Implanon, Jadelle), injectables (DMPA-SC, Depo-Provera, Noristerat), female condoms, pills, and male condoms. In addition to family planning commodities, ASSP provided facilities with reproductive health equipment including scales, blood pressure monitors, and gynecological tables. To strengthen family planning human resources, ASSP trained a group of national "Master Trainers" who were expected to conduct a 14-day training in family planning service at the provincial and health zone level.

To evaluate the impact of the project, Tulane University's School of Public Health and Tropical Medicine in partnership with the Kinshasa School of Public Health, conducted baseline and endline population-based surveys consisting of household, women, health facility modules in April-May, 2014 and in July-September, 2017, the final year of the project. The evaluation study used a quasi-experimental panel design with constructed treatment and comparison groups (Figure 1).

As seen in Figure 2, the ASSP project was implemented in health zones in five provinces (Nord Ubangi, Kasai, Kasai Central, Maniema, and Tshopo). Unfortunately, civil unrest in two provinces, Kasai and Kasai Central, prevented the impact evaluation endline surveys to be carried out in those regions. For this reason, this study would only include the provinces that we had data both from baseline and endline survey (Nord Ubangi, Maniema, Tshopo).

In this study we assess the impact of the potential impact of ASSP interventions to increase modern contraceptive use among women in reproductive age. Furthermore, we will investigate the correlates of the potential impact on modern contraceptive use, using multiple sources of data, such as facility-based surveys. Facility-based survey data allows us to assess the effect of supply environment and availability of quality family planning services in relation to the impact of the family planning interventions on modern contraceptive use in intervention and control areas.

Methods

Sample:

The first sampling area consisted of health zones within Nord Ubangi, and the second consisted of health zones within Maniema and Tshopo. A matched comparison group consisting of randomly selected villages within matched health areas outside of ASSP-supported health zones that did not receive the ASSP intervention package was also selected at the baseline and endline surveys, 1,394 and 2,149 households were selected in intervention (ASSP-supported) areas, and 1,410 and 1,935 households were selected in control (non-ASSP supported) areas, respectively. All women in reproductive age (15-45 years old), were interviewed with the family planning section of the survey. Overall, 1,443 women at baseline and 2,109 women at endline surveys were interviewed in ASSP-supported areas, while, 1.523 women at baseline and 2,053 women at endline surveys were interviewed in the non-ASSP supported areas. Moreover, a sample of 69 health facilities at the baseline and 81 health facilities at the endline were selected in the ASSP areas. For non-ASSP areas, a sample of 67 health facilities at the baseline and 95 health facilities at the endline were selected. All selected health facilities were interviewed with the facility survey instrument which with a family planning service section. Also, facilities were audited for the stock of condoms, pills, implants and IUDs.

Analysis:

Descriptive analysis was performed for all selected women in both ASSP and non-ASSP areas. To assess the impact of the project on modern contraceptive use, we used the difference-in-difference (DID) analysis method. The DID model compares the difference in the outcome variable (modern contraceptive use) over time (between 2014 and 2017) between ASSP and non-ASSP areas (treatment

and control). DID analysis allows us to assess the association between intervention and subsequent outcomes is often evaluated by pre-post assessments. Outcomes after implementation of the intervention are compared with those before. This design relies on the assumption there are no underlying time-dependent trends in outcomes unrelated to the intervention (Dimick and Ryan, 2014).

Results

Descriptive statistics

Results of the descriptive analysis of the baseline and endline module on knowledge of women of any modern contraceptive method appear in Table 1, and on contraceptive use in Table 2 and Table 3.

Percent of women who know specific methods

Table 1 reports the comparison of knowledge of women on modern contraceptive methods at baseline and endline. The total number of known methods was calculated for each woman in each module. The mean number of methods known for women increased from 5.1 in 2014 to 5.5 in 2017 in ASSP areas, and from 5.3 to 6.0 in non-ASSP areas, which is statistically significant at the 0.05 level in both areas. The percentage of women in ASSP areas familiar with the injectable and implant methods increased significantly between the baseline (2014) and endline (2017) modules, whereas no significant change was detected on knowledge of these methods in non-ASSP areas (2014: 51.3 percent vs. 2017: 68.7 percent, p=<0.001). Paradoxically, in ASSP areas, the percent of women who knew any modern method significantly declined between the 2014 and 207 modules by 5.1 percentage points (p=0.015), despite the increase in the mean number known.

Table 2 shows the change in MCPR between baseline in 2014 and endline in 2017 separately for the ASSP areas (two domains combined) and the non-ASSP areas. MCPR changed from 8.9 percent to 9.2 percent in the ASSP areas and from 4.8 percent to 5.8 percent in the non-ASSP; neither change was statistically significant.

Table 3 provides detail on contraceptive method mix in both ASSP and non-ASSP areas at baseline and endline. The percent of women using implants and injectables increased in ASSP areas between two modules (0.9 percent vs. 3.1 percent for implant, 0.2 percent vs. 0.9 percent for injectables), whereas male condom use declined by 2.6 percentage points in ASSP areas but increased in non-ASSP areas. Although not taken into consideration in measuring MCPR, the proportion of women using traditional methods in ASSP areas decreased slightly from 7.8 percent to 3.6 percent, whereas it increased from 2.7 percent to 4.4 percent in non-ASSP areas. The change in the percentage of use of specific methods was not tested for significance due to the small numbers of women using each method.

Difference-in-differences model

The analysis assesses the impact of the ASSP project on two main contraceptive indicators: the knowledge of women of reproductive age of modern contraceptive methods and use of modern contraception. In the field of family planning, MCPR and other indicators are calculated based on two different populations: married women of reproductive age, and all women of reproductive age. In this analysis, we follow the indicator championed by the FP2020 initiative and use all women of reproductive age, which reflects the goal of increasing access to and use of contraceptives by both married and unmarried women. For reasons explained earlier and in greater detail, the endline survey was limited to only two domains (Nord Ubangi and Maniema/Tshopo), due to political unrest in Kasai/Kasai Central.

To assess the impact of the project on modern contraceptive use, we used the difference-in-difference (DID) method. The DID model compares the difference in the outcome variable (modern contraceptive use) over time (between 2014 and 2017) between ASSP and non-ASSP areas.

The adjusted DID models for modern contraceptive use are shown in Tables 4 to 7. Table 4 displays the fully adjusted DID model for modern contraceptive use among women of reproductive age in ASSP and non-ASSP areas. There was no significant program effect on modern contraceptive use. The fully-adjusted model indicates that, of seven independent variables tested as possible correlates of contraceptive use, four were significant. Women living in Maniema (compared to Nord-Ubangi), in peri-urban settings (compared to rural area), having more children (3-4, 5+), and those who were more educated are significantly more likely to use modern contraceptive.

Since the descriptive analysis showed an increase in the proportion of women using long-acting reversible contraceptive (LARC) methods (i.e., implants and IUDs), we performed a separate DID analysis to assess the impact of the program, with use of LARCs among women of reproductive age as the dependent variable. Table 5 illustrates the fully adjusted DID model for modern contraceptive use limited to LARC methods. Our analysis showed a significant effect of the project on the use of LARCs. Specifically, women in the intervention areas in 2017 had a significantly higher probability of using LARCs compared to their counterparts (p=0.045). The same model shows that women in peri-urban areas, with some primary, completed primary, or completed secondary education, married or in union, and/or women with 5+ children have significantly higher probabilities of using LARCs compared to the reference groups.

In another attempt to capture the impact of the program on modern contraceptive use and to control for any other differences at village level (which could affect the outcome), we jointly used DID and fixed-effects methods. Results from village fixed-effect model also showed no significant program effect on modern contraceptive use among women in the treatment area (data not shown).

Since there was a significant correlation between modern contraceptive use and the sampling domain, we conducted further analysis to assess the DID model for each sampling domain (Table 6). Results from these two fully adjusted models suggest that there was a significant effect in Nord Ubangi (marginal effect: 3.6 percent, p=0.025), while a significantly negative effect was detected for Maniema/Tshopo (marginal effect: -6.3 percent, p=0.002). In short, ASSP had the expected effect on modern

contraceptive use in Nord Ubangi (that was not found in the non-ASSP areas), but no such effect occurred in Maniema/Tshopo.

Specific to the family planning intervention, in 2015 DFID indicated to ASSP project staff an expectation of an increase of 1.8 percentage points per year in MCPR in the ASSP treatment areas, consistent with goals set by the 2012 London Summit for different countries. The descriptive statistics shown in Table 5 show that in the three-year period between 2014 and 2017, MCPR in Nord-Ubangi increased from 2.7 percent to 8.1 percent. This increase of 5.4 percentage points over the three years equates to 1.8 percentage points per year, exactly the level of change that DFID expected from this project. However, the same results were not evident in Maniema/Tshopo, for reasons discussed elsewhere.

Table 7 illustrates the program effect of the ASSP on different wealth categories of the women population. The analysis was carried out to assess the DID model limited to constructed wealth categories based on wealth quintile. The respondents were recoded as two levels of wealth; 1- Low and low-middle quintile, 2- Middle, high-middle, and high quintile. Results from these two fully adjusted models suggest that there was no significant program impact on modern contraceptive use in any of the wealth categories.

Furthermore, as a robustness check, we included a variable in the difference-in-difference models for modern contraceptive use that estimated the straight-line distance between the woman's household and the nearest governmental health facility. There were no changes in the direction or significance of the impact of ASSP in any of the models, and the distance variable was never significant. Also, there was no significant association related to woman's distance to the nearest health facility between ASSP and non-ASSP areas at baseline or endline.

Discussion

This study assesses the impact of the ASSP project relative to the objective of improving modern contraceptive use through intervention resulting in increased access to family planning services. Overall the impact evaluation did not show a significant increase in MCPR in ASSP areas that can be attributed to ASSP. This finding masks the fact that in one of the two domains (Nord Ubangi), the project did have a significant effect on MCPR, whereas in the other, MCPR showed no improvement. This finding is particularly noteworthy, since Nord Ubangi started at the very low end of the "S curve," where increases in MCPR are most difficult to achieve (Track 20, 2018).

Another noteworthy result was the effect of the project on the use of LARC methods. Given the importance of LARCs on the continuity of contraceptive use, this result was also positive in terms of project impact. A third finding of interest was higher knowledge of and use of modern contraceptive methods among women in Maniema/Tshopo as compared to the other sampling areas in the ASSP baseline. One possible explanation is that women from Maniema/Tshopo were significantly higher on the wealth index than their counterparts in Nord Ubangi. Also, this higher MCPR most likely reflects the effects of previous family planning interventions in this area.

In conclusion, both descriptive analysis and fully adjusted DID models highlight that the ASSP project has significantly increased use of LARC methods. Specifically, the ASSP project had a significant impact on implant use. Furthermore, both descriptive analysis and fully adjusted DID models suggest that the ASSP project had a significant impact on modern contraceptive use in Nord-Ubangi. However, this impact was not detected in Maniema/Tshopo. **T**he analysis did not show a significant increase in knowledge of modern contraception, in part because the percentage of women that knew specific methods in ASSP and non-ASSP areas varied over modules in ways that were difficult to interpret (e.g., loss of knowledge in terms of Cyclebeads and female condom). Further analysis will be performed (to be presented at the 2019 PAA meeting) to assess the feasible justification for variation in impact detected in two different domains (Nord Ubangi and Maniema/Tshopo). For the purpose of this complimentary analysis we would use the information collected in facility-based surveys at the baseline and the endline in both ASSP and non-ASSP areas.

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Table 1 Comparison of contraception knowledge among all women age 15-49, ASSP baseline and endline module DRC

	ASSP			Non-ASSP		
	2014	**2017**	**p-value**	**2014**	**2017**	**p-value**
N (not weighted)	1,443	2,109		1,523	2,053	
percent (weighted)	%	%		%	%	
Knowledge of any modern method	92.0	86.9	**0.015**	90.8	91.4	0.760
Know female sterilization	35.8	40.3	0.239	61.7	51.9	**0.011**
Know male sterilization	12.9	15.1	0.344	16.9	20.3	0.379
Know IUD	19.5	25.8	0.073	31.1	30.4	0.933
Know injectables	51.3	68.7	**<0.001**	64.4	71.7	0.131
Know implants	30.6	64.6	**<0.001**	22.7	41.8	**0.041**
Know the pill	47.6	48.5	0.870	51.0	58.5	0.205
Know condom	83.2	77.0	0.076	83.2	79.0	0.155
Know female condom	38.3	29.4	**0.025**	37.7	33.2	0.289
Know jelly or foam	12.6	8.1	0.064	9.4	6.3	0.548
Know emergency contraception	25.0	17.6	0.083	10.0	18.1	0.124
Know cyclebeads	32.0	23.0	**0.014**	19.9	22.0	0.750
Know LAM	39.1	38.9	0.956	44.0	46.1	0.601
Mean number of modern methods known	5.1	5.5	**0.003**	5.3	6.0	**0.001**

Note: Percentages are weighted

Table 2 Percentage of reproductive-aged women using a modern contraceptive method by selected characteristics.								
	ASSP				**Non-ASSP**			
	2014 (*n=1,443*)	**2017 (*n=2,109*)**	**Absolute change**	***p-value***	**2014 (*n=1,523)***	**2017 (*n=2,053*)**	**Absolute change**	***p-value***
Modern contraceptive use	8.9	9.2	0.3	0.799	4.8	5.8	1.0	0.491
Sampling domain								
Nord/Sud Ubangi	2.7	8.1	5.4	**0.001**	2.5	4.1	1.5	0.200
Maniema/Tshopo	12.0	10.2	-1.8	0.319	11.0	10.8	-0.2	**0.934**
Setting								
Peri-urban	14.2	18.6	4.4	0.234	7.9	16.1	8.1	0.094
Rural	8.2	7.6	-0.6	0.693	4.7	5.1	0.4	0.783
Wealth quintile								
Low	3.0	5.4	2.4	0.320	0.4	3.7	3.2	**0.010**
Low middle	6.4	13.1	6.7	0.165	2.8	3.4	0.6	0.811
Middle	5.8	7.2	1.4	0.584	1.2	4.6	3.4	**0.010**
High middle	10.2	11.5	1.3	0.690	2.4	6.3	3.8	**0.043**
High	14.3	9.6	-4.7	0.119	12.4	9.0	-3.4	0.178
Level of education								
No education	4.6	3.9	-0.7	0.766	1.7	1.5	-0.1	0.933
Some primary	6.8	9.0	2.1	0.265	2.0	6.5	4.6	**0.006**
Completed primary	13.7	12.7	-0.9	0.745	8.5	7.0	-1.5	0.672
Completed secondary	45.9	35.9	-10.0	0.524	25.6	26.9	1.3	0.962

Note: Percentages are weighted

Table 2 (con't). Percentage of reproductive-aged women using a modern contraceptive method by selected characteristics.								
	ASSP				**Non-ASSP**			
	2014 (*n=1,443*)	**2017 (*n=2,109*)**	**Absolute change**	***p-value***	**2014 (*n=1,523)***	**2017 (*n=2,053*)**	**Absolute change**	***p-value***
Marital status								
Never married	10.5	7.2	-3.4	0.459	10.6	6.9	-3.7	0.330
Married/in a union	8.4	9.1	0.7	0.667	2.8	5.8	3.0	**0.042**
Divorced/widowed	9.2	15.7	6.5	0.179	8.5	4.3	-4.2	0.397
Number of living children								
0	5.8	5.7	-0.1	0.971	9.6	6.1	-3.5	0.321
1-2	8.8	8.3	-0.5	0.858	2.1	5.1	3.0	**0.046**
3-4	12.8	8.9	-3.9	0.108	4.9	6.9	2.0	0.414
5+	7.9	13.3	5.3	**0.030**	3.5	5.3	1.8	0.553
Total number of women using modern contraceptive methods	111	185			64	116		

Note: percentages are weighted

Table 3 Comparison of contraception variables for all women, age 15-49, ASSP baseline and endline module DRC						
		ASSP			**Non-ASSP**	
	2014	**2017**	**p-value**	**2014**	**2017**	**p-value**
N (not weighted)	1,443	2,109		1,523	2,053	
% (weighted)	%	%		%	%	
Currently using any method	16.0	13.0	0.182	7.4	10.6	0.231
Currently using a modern method	8.9	9.2	0.798	4.8	5.8	0.489
Current contraceptive method used						
None	84.0	87.2		92.6	89.9	
Modern methods						
Female sterilization	0.4	0.5		0.7	0.3	
Male sterilization	0.0	0.1		0.0	0.0	
Implants	0.9	3.1		0.6	0.2	
Injectable	0.2	0.9		0.0	0.4	
IUD*	0.1	0.0		0.0	0.3	
Pill	0.2	0.4		0.0	0.2	
Male condom	5.0	2.4		2.8	3.4	
Female condom	0.1	0.1		0.0	0.2	
Foam/Jelly	0.0	0.0		0.0	0.0	
SDM (Cyclebeads)	0.1	0.1		0.0	0.0	
LAM**	1.1	1.3		0.5	0.5	
Other modern methods	0.1	0.2		0.0	0.2	
Traditional methods						
Rhythm/calendar	6.3	1.6		1.6	2.3	
Withdrawal	1.2	1.2		0.7	1.4	
Other traditional methods	0.3	0.8		0.4	0.7	

Note: Percentages are weighted

*Intra-Uterine Device

** Lactational Amenorrhea Method

Table 4 Full model results of determinants of modern contraceptive use (DID model) (n=6,374)

	ASSP vs. non-ASSP		
	Marginal effect	**SE**	**p-value**
ASSP vs. non-ASSP	0.046	0.022	**0.034**
Year (2017 vs. 2014)	0.015	0.010	0.116
Interaction (Year*ASSP)	-0.008	0.013	0.512
Region			
Nord/Sud Ubangi (ref)			
Maniema/Tshopo	0.020	0.007	**0.003**
Rural (ref)			
Peri-urban	0.030	0.009	**0.001**
Age			
15-19 (ref)			
20-24	0.026	0.012	**0.027**
25-34	0.010	0.012	0.394
35-44	0.017	0.014	0.205
45-49	-0.025	0.014	0.071
Education			
No education (ref)			
Some primary	0.027	0.007	**<0.001**
Completed primary	0.062	0.009	**<0.001**
Completed secondary	0.247	0.057	**<0.001**

Table 4 (con't). Full model results of determinants of modern contraceptive use (DID model) (n=6,374)

	ASSP vs. non-ASSP		
	Marginal effect	**SE**	**p-value**
Marital status			
Not married (ref)			
Married/in a union	-0.012	0.015	0.442
Divorced/separated/widowed	0.011	0.019	0.546
Wealth quintile			
Low (ref)			
Low middle	-0.004	0.012	0.726
Middle	-0.004	0.012	0.722
High middle	0.015	0.012	0.227
High	0.011	0.013	0.391
Number of living children			
0 (ref)			
1-2	0.017	0.010	0.068
3-4	0.049	0.012	**<0.001**
5+	0.062	0.014	**<0.001**

Table 5 Full model results of determinants of modern contraceptive use (limited to LARC users) (DID model) (n=6,374)

	ASSP vs. non-ASSP		
	Marginal effect	**SE**	**p-value**
ASSP vs. non-ASSP	-0.007	0.016	0.659
Year (2017 vs. 2014)	0.010	0.007	0.153
Interaction (Year*ASSP)	0.018	0.009	**0.045**
Region			
Nord/Sud Ubangi (ref)			
Maniema/Tshopo	-0.009	0.004	**0.040**
Rural (ref)			
Peri-urban	0.018	0.006	**0.002**
Age			
15-19 (ref)			
20-24	0.004	0.007	0.589
25-34	0.003	0.007	0.696
35-44	0.016	0.009	0.063
45-49	0.009	0.011	0.411
Education			
No education(ref)			
Some primary	0.012	0.004	**0.004**
Completed primary	0.018	0.005	**0.001**
Completed secondary	0.030	0.023	0.204
Marital status			
Not married (ref)			
Married/in a union	0.013	0.006	**0.038**
Divorced/separated/widowed	0.034	0.010	**0.001**

Table 5 (con't). Full model results of determinants of modern contraceptive use (limited to LARC users) (DID model) (n=6,374)

	ASSP vs. non-ASSP		
	Marginal effect	**SE**	**p-value**
Wealth quintile			
Low (ref)			
Low middle	0.002	0.007	0.741
Middle	-0.002	0.006	0.721
High middle	0.014	0.007	0.054
High	0.003	0.007	0.632
Number of living children			
0 (ref)			
1-2	0.005	0.006	0.332
3-4	0.015	0.007	0.025
5+	0.028	0.008	**0.001**

Table 6 Full model results of determinants of modern contraceptive use for Nord/Sud Ubangi and Maniema/Tshopo (DID model)

	ASSP vs. non-ASSP (n=3,265)		
Nord/Sud Ubangi	**Marginal effect**	**SE**	**p-value**
ASSP vs. non-ASSP	-3.090	0.028	0.271
Year (2017 vs. 2014)	0.310	0.012	0.790
Interaction (Year*ASSP)	3.621	0.016	**0.025**
	ASSP vs. non-ASSP (n=3,298)		
Maniema/Tshopo			
ASSP vs. non-ASSP	0.135	0.034	**<0.001**
Year (2017 vs. 2014)	0.035	0.016	**0.027**
Interaction (Year*ASSP)	-0.063	0.021	**0.002**

Table 7 Full model results of determinants of modern contraceptive use based on wealth quintile (DID model).

	ASSP vs. non-ASSP (n=2,131)		
Low and low-middle quintiles	**Marginal effect**	**SE**	**p-value**
ASSP vs. non-ASSP	-0.194	0.411	0.637
Year (2017 vs. 2014)	0.054	0.179	0.763
Interaction (Year*ASSP)	0.425	0.233	0.068
	ASSP vs. non-ASSP (n=4,432)		
Middle, high-middle, and high quintiles	**Marginal effect**	**SE**	**p-value**
ASSP vs. non-ASSP	-0.017	0.037	0.637
Year (2017 vs. 2014)	0.005	0.016	0.763
Interaction (Year*ASSP)	0.038	0.021	0.070

Figure 1. Quasi-experimental partial panel design with intervention and matched comparison groups

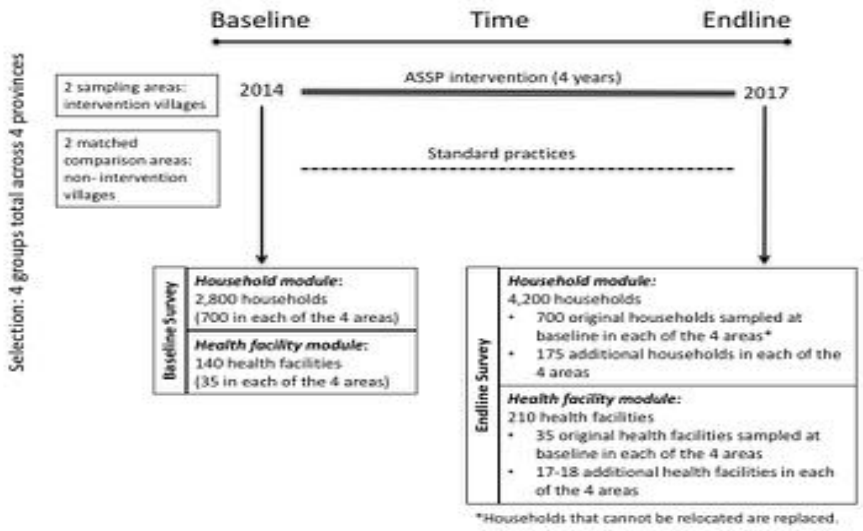

Figure 2. Map of ASSP-assisted health zones