



# Decentralized Evaluation

## PAA Africa programme in Senegal's Kédougou region

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## **Executive Summary**

1. Purchase from Africans for Africa (PAA Africa) is a programme inspired by the lessons learned from Brazil's Zero Hunger initiative, combining school feeding activities with institutional procurement from farmers' organizations (FOs). It is currently being implemented in five African countries: Ethiopia, Malawi, Mozambique, Niger and Senegal. In Senegal, the programme has been implemented in the Kédougou region since 2012. After a one-year pilot phase, the second phase, or consolidation phase, started in September 2013 and ended in July 2016.
2. On the one hand, this report seeks to report on business activities and to account for the outcomes achieved by the PAA Africa Senegal project. Second, it seeks to understand why some results have occurred and others have not. In addition, it draws information for the project extension phase which is supposed to begin in 2017, particularly with respect to coordination of the partnership and operational and strategic decision-making processes.
3. Numerous users are expected to make use of this evaluation report. The PAA Africa/World Food Programme (WFP) and the Food and Agriculture Organization of the United Nations (FAO) Coordination Units and their partners are the first recipients. The report will help to identify changes to the design and implementation of the programme and raise key issues to discuss with the Government of Senegal to enhance the relevance and effectiveness of the PAA Africa Senegal project's extension phase. The Government of Senegal will be able to draw on valuable information collated during the consolidation phase, both to complete the project extension phase successfully and to develop its autonomous national school feeding programme.

## **Methodology**

4. The criteria for the evaluation were relevance, effectiveness, efficiency, impact and sustainability. The issues that were assessed are those specified in the framework of the terms of reference (ToR). With the relevance criterion, we considered whether the choice of the three departments of the Kédougou region was justified with respect to food insecurity, level of education and level of poverty compared to other areas of the country. With the effectiveness criterion, achievements in agriculture and school feeding were compared to the project's objectives. Has the project improved the capacity to manage school canteens by the schools themselves? Has the project enabled children to have school meals that comply with national food standards? With respect to agriculture, we considered the level of participation of men and women in the project by checking if the project has actually benefited smallholder farmers and provided them with stable markets for their agricultural surplus. The evaluation team checked whether smallholders had increased their production capacity and marketing, and whether their yield per hectare, their income and food security had improved. With the impact criterion, the evaluation focused on the effects of the project in terms of academic performance, including

improving the nutritional status of beneficiary children, improving the negotiating capacity of producer organizations, and improving market access for producers and changes in behaviour. With the efficiency criterion, the evaluation team assessed PAA Africa Senegal's ability to use the least amount of resources to produce results, delays in the performance of activities, and possible barriers that could limit participation in the project to its potential beneficiaries. The last evaluation criterion applied to PAA Africa Senegal is sustainability. We sought to understand whether the Ministry of National Education will be able to substitute WFP in financing canteens of beneficiary schools at the end of the project and maintain the quality standards achieved by the latter, or understand whether the performance of smallholder farmers will survive the project. Qualitative data were collected by organizing 14 focus groups and 33 individual interviews. Secondary quantitative data were collected from a variety of sources, including the Ministry of National Education and the decentralized structures of the Ministry of Agriculture, WFP and FAO. Descriptive statistical tools were used to analyse quantitative data and highlight key trends. Matching techniques were used to establish the study's schools groups and assess the impacts of canteens on educational performance. The method of double difference was applied to isolate the specific impact of the project on the academic performance of public primary schools benefiting from the project. The results of the quantitative and qualitative analyses were triangulated to ensure their reliability. The indicators used were systematically disaggregated to enable a gender analysis.

### **Key results**

5. PAA Africa Senegal supported producers and school-feeding activities in the Kédougou region, which registered the highest poverty rate in Senegal – 71.3 percent in 2011 compared to 46.7 percent of the national average (ANSD, 2011) – and a prevalence rate of food insecurity of 33 percent (SE-CNSA, 2013). Therefore, the school canteen proved to be a powerful tool to attract and retain schoolchildren who are increasingly attracted by the prospects of quickly earning money and who thus decide to give up on school. From an educative, food security and schooling point of view, the region of Kédougou was certainly the most appropriate region in the country to welcome PAA Africa Senegal. Further evidence of the relevance of the project is the bridge that the project sought to establish between agriculture and education by using school canteens as markets for rice produced by small producers in areas where the beneficiary schools are located. Finally, the alignment of PAA Africa Senegal with the national policy to develop school canteens and the role assigned to the Ministry of National Education and the Food Security Commissioner in the implementation of the project provides further evidence of the project's relevance.
6. PAA Africa Senegal has accomplished many achievements. It has strengthened the capacity of producers through a series of training sessions and regular surveillance by means of field visits. Producers were trained in the technical aspects of rice crop management, organizational dynamics and security reserve policies between

2013/2014 and 2015/2016. They also received agricultural pre-harvest and post-harvest equipment (seed kits, fertilizer and rice dehusking equipment). Several farmer unions were trained during the course of the project in the area. PAA Africa Senegal's involvement increased agricultural capacity and significantly increased the developed cropping areas and agricultural productivity of the beneficiary producers. The average yield was estimated at 2.5 mt/ha in 2012/2013 and 3.2 mt/ha in 2015/2016 against 0.8 mt/ha in 2011/2012, a respective increase of 1.7 mt/ha. On average, the quantity of paddy rice produced by the beneficiary producers has almost doubled from 422 kg to 808 kg, with stronger growth among women producers. The increase in production has not lowered the price for producers of paddy rice. One of the major goals of the project in supporting producer organizations was developing their negotiating capacity. The overall finding is that, despite free access to agricultural inputs and equipment, paddy rice prices paid to beneficiary producers were higher than those recorded in other regions of the country, as in the Senegal River Valley. The price offered by PAA Africa was 145 CFA francs, against 125 CFA francs in the Senegal River Valley and 135 CFA francs in the local market. Negotiations between the Development Company of Textile Fibres (SODEFITEX) and producers' unions in the Kédougou region were settled by way of an agreement on a producer price set at 135 CFA francs for the 2016/2017 cropping season. The income of beneficiary producers has grown rapidly as a result of increased production and better prices for the producer. This allowed producers to increase their food expenses, but also their health and education expenses. The food security of beneficiary producer households has improved greatly; producers have sold their grain surpluses after setting up security reserves. No data were recorded to assess the project's impacts on food consumption expenditure and non-food consumption expenditure, which would have allowed for an assessment of the project's impact on the welfare of the producers' households.

7. The project has brought other benefits to producers: the time spent on working on land preparation for cropping has in fact decreased; women, in particular, benefited from this and were able to increase the amount of time devoted to other agricultural activities, and thus improving their yields more than the men could. In addition, they could use the time they save for their well-being and that of their households. With respect to education, the project initially provided benefits to 1,800 public primary schools in the departments of Bandafassi, Dar Salam and Dimboli. Two years later, in 2013, that number was halved due to financial difficulties faced by WFP. Equally concerning, the food ration was reduced to only white rice being distributed in the schools still benefiting from the programme. Communities were obliged to bring additional products to prepare an acceptable meal. A major outcome of the PAA Africa Senegal project was that it was able to mobilize communities by using canteen management committees. Overall, the involvement of communities focused on food preparation by women producer beneficiaries, in-kind contributions (condiments, rice, corn, broth, etc.) and cash contributions (the contributions of students). Teachers were highly involved in running the school

canteens, as they supervised the management of the canteens. The teachers who were interviewed have all stated that canteen activities were not so demanding as to prevent them from properly doing their class work. The aim was to encourage children to stay in school.

8. There is no quantitative data to evaluate the project's effect on the nutritional status of children and on the nutritional status of PAA beneficiary households. However, from different one-on-one and group interviews conducted by the evaluation team, it appears that the beneficiary students have experienced improved nutritional status and food security. While beneficiary students did spend more time in school, the impact assessment results are mixed when it comes to school performance using the double difference. The distribution of meals at school has led to an increased number of enrolments in the introductory course in the schools benefiting from PAA canteens. There was also a significant improvement in the successful completion of the primary school-leaving certificate (the certificate of completion of elementary education, the CFEE) in schools benefiting from the project as opposed to schools that did not benefit from the project. However, PAA canteens were not able to significantly reduce the number of school drop-outs. The drop-out rate for girls continued to increase by 2 percent between 2011 and 2015 in beneficiary schools as opposed to non-beneficiary schools.
9. The sustainability criterion enabled an assessment that sought to determine whether the PAA Africa Senegal project process, well after the withdrawal of WFP, will continue to function normally with respect to the production and marketing of paddy rice or the regular provision of white rice to schools. On the one hand, sustainability issues examine the ability of producers to continue to obtain good yields and market their grain surplus after the withdrawal of PAA Senegal, and on the other hand, they examine the ability of the government to provide the beneficiary schools with resources to ensure the smooth running of their school canteens. For producers, the chances of sustainability decrease. Indeed, PAA responded to lessons learned from difficulties encountered in the first phase of the project by closely involving state departments, including the Support Project for Small Local Irrigation (PAPIL), the Support Programme for Agricultural Development and Rural Entrepreneurship (PADAER), and the Regional Directorate of Rural Development (DRDR), in PAA's activities and the completion of the second phase. Each of these partners played a specific role, especially in relation to the strengthening of producers' capacity, the supply of inputs and equipment, and the technical monitoring of crops. Regarding the marketing aspect, PAA Senegal relied on SODEFITEX to purchase paddy rice and on PADAER for the marketing of seed production. This suggests that, one way or another, producers will receive support even after the completion of PAA. However, there are two main challenges to overcome: the first and most important one is the free-access system that was set up and which could make it difficult to switch to another system where producers must fully pay for all costs relating to agricultural inputs and equipment. The second challenge is the payment of the costs of other partners being assisted by PAA Senegal.

10. With respect to school canteens, it is questionable whether they will continue to function normally after the withdrawal of PAA. The number of schools benefiting from canteens dropped from 180 to 90 in two academic years, and by the end of November 2016 no school was running its canteen. The continuity of operating school canteens is a battle that is far from being won. Moreover, schools benefiting from PAA Senegal have not learned how to source directly from local producers to the extent that dealings between the two categories of beneficiaries has not been tested by the project. However, buying local products to feed the students is PAA Africa's pioneering idea. WFP was directly responsible for purchasing rice from producers; the schools received rice directly from WFP and were not in direct relation with the producers. How can the concept then become functional if the project ends before the concept is tested? The sustainability of school canteens set up under the programme may also be examined from the point of view of financing. During the focus groups, producers have indicated that it is difficult or impossible for communities to provide rice freely to schools, as surplus production is marketed to address spending on education, health and other household needs. While communities will continue to support canteens, their contribution will not be sufficient to ensure beneficiary students have a supply of food in the quantity and quality of a normal operating school canteen. Hence the need for the government to substitute PAA Africa Senegal by funding schools and providing schools with adequate financial resources. Will such a condition be fulfilled?
11. From the beginning of the 2016/2017 school year, the Government of Senegal has introduced reforms to the financing of schools by transferring 3,700 CFA francs per student to an account opened by the school's management committee, of which 16.4 percent must be allocated to the school canteen. This measure will ensure the sustainable public financing of canteens. However, the budget is still low. Yet, the Government of Senegal has several policy levers that could be employed to ensure that school canteens in rural Kédougou are provided with the financial means to acquire their food locally and provide students with an adequate daily ration. First, as a part of its social protection policy for the poor, a portion of the resources should be allocated to the school canteen programme, which is considered to be a social safety net. Next, the one billion francs annual budget allocated by the Ministry of National Education to the school canteen programme should be substantially increased so as to better cover the basic needs of canteens. Given the significant increase in public resources recorded in recent years and the good prospects for economic growth posted by the country, freeing up an additional several billion francs for food in schools is sustainable from a budgetary perspective.
12. The development of an autonomous nutrition programme for schools planned by the Ministry of National Education in 2017 should offer official goals for coverage, types of rations, annual budgets and the programme funding contribution expected of all national partners, including the central state. This programme must also demonstrate the fiscal sustainability of the state's projected contribution and submit strong advocacy material to the Minister of Economy and Finance, the parliament and local councils in order to sway public opinion and make school

feeding one of the prioritized policies in the national strategy for combating poverty, malnutrition and school drop-outs.

## **Conclusions**

13. Comprehensively, PAA Africa Senegal's agriculture component has experienced some success even if we were not able to rigorously monitor the influences of other projects that also benefited the producers. However, the food for schools component encountered significant difficulties in its implementation, mainly due to the lack of resources that WFP was provided with during the first two years of the project being launched in Kédougou. The following recommendations are based on information collated during the assessment of the project's consolidation phase.

## **Key recommendations**

- Support producers' unions to strengthen their negotiating capacity, and find diverse markets so that SODEFITEX is not the only outlet for their rice production surplus.
- Support producers in integrating into a credit system, ensuring regular access to agricultural equipment and quality inputs.
- Ensure that training for producers is carried out in a convenient and accessible manner.
- Assist producers with post-harvest activities, including threshing, dehusking and sorting.
- In addition to the fight against food insecurity among children, PAA Africa Senegal should make the prevention of, and reduction of, early school drop-outs its primary objective in assisting primary education in Kédougou.
- Raise public awareness so that communities commit to providing food at schools.
- In order to promote healthy eating habits, the project had to provide education on a balanced diet in schools.
- Include bleach in the minimum package of products to be supplied to schools.
- Find practical solutions for the storage of food and kitchen utensils in good conditions in schools.
- Ensure compliance with WFP's official food ration. The distribution of rice only is a practice that should not be encouraged.
- Include in project activities the monitoring of dietary rations that are actually served to students, and monitor the education of a proper diet.
- Improve the communication between project beneficiaries and other local and national stakeholders, including with respect to the prospects of project coordination.

- Collect quantitative data for a more rigorous assessment of the portion of the project relating to agricultural impacts.
- Anthropometric measures may be taken regularly by WFP to verify that the nutritional status of students in beneficiary schools has improved.
- Only start a project in the PAA Africa Senegal extension phase if funding has been acquired for the duration of the extension phase. FAO and WFP must ensure that any project included in the extension phase will be adequately funded.
- Reduce administrative procedures to prevent delays in paying for local foods.
- Establish direct contact between schools and local producers supported by the project to ensure that school canteens are supplied with local products and thereby implement the Purchase from Africans for Africa concept.
- Involve the General Delegation for Social Protection and National Solidarity (DGPSN) in creating the PAA Africa Senegal extension phase to obtain a contribution to the financing thereof.
- Involve any administrative and technical departments that are decentralized from the government to ensure greater local ownership of projects during the PAA Africa Senegal extension phase.
- Develop a strategy for mobilizing communities (producers, parents of students, businesses and local officials) for a greater contribution to the smooth functioning of canteens.
- The terms of reference must be limited to the main issues and ensure that the available data can provide them with a response.
- Support the Government of Senegal in the development of an autonomous national school feeding programme capable of taking over from PAA Africa and from other WFP programmes helping with nutrition in schools.

## **1. Introduction**

- 1. Purchase from Africans for Africa (PAA Africa) Senegal.** PAA Africa is a programme based on lessons learned from Brazil's "Zero Hunger" programme, which combines food supply initiatives with agricultural supply mechanisms provided to farmer organizations. Implemented in four other African countries, (Ethiopia, Malawi, Mozambique and Niger), the programme in Senegal was first implemented in the Kédougou region in 2012. Following a pilot phase of one year, a consolidation phase started in September 2013 and ended in July 2016. Commissioned by PAA Africa/WFP-FAO Coordination Units, this report seeks, first, to report on activities that were undertaken and outcomes that were achieved by PAA Africa Senegal, and second, to understand the reasons why some of its outcomes occurred and others did not. It also includes instructive information, notably for the project extension phase which will begin in 2017, particularly with respect to coordination of the partnership, operational, and strategic decision-making processes.
- 2. Users of this report.** Numerous users are expected to benefit from this evaluation report. The PAA Africa/WFP-FAO Coordination Units and their partners are the first recipients. The report will help to identify changes to the design and implementation of the programme and raise key issues to discuss with the Government of Senegal, and to enhance the relevance and effectiveness of the PAA Africa Senegal project's extension phase. Given their key technical and operative roles in West Africa, the regional offices of WFP and FAO located in Dakar should be able to use the results of the evaluation report in their involvement in other African countries, particularly with respect to strategic operations, project creation and monitoring. WFP's and FAO's evaluation offices may use the results of the assessment, if any, to supplement evaluation summaries and the annual reports of WFP's Executive Board and FAO's governing bodies. The Government of Senegal will be able to draw on valuable information collated during the consolidation phase, both to successfully complete the project extension phase and develop its autonomous national school feeding programme.

## **Background**

- 3. Socio-economic characteristics of Senegal.** Located on the west coast of sub-Saharan Africa, Senegal is surrounded by Guinea-Bissau and Guinea to the south, Mauritania to the north, and Mali to the east. In 2013, it had an approximate population of 13.5 million,<sup>1</sup> and it is one of the most politically stable countries in West Africa. However, Senegal is also characterized by high levels of poverty and food insecurity, as well as by low levels of education. Poverty affected almost half of the population in 2011 (ANSD, 2011), and the gross domestic product (GDP) growth is well below the rate needed for a significant reduction in the incidence of poverty. The predominance of industries with a high level of export capital over industry sectors

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<sup>1</sup> ANSD (RGPHAE), 2013.

with high labour intensity limits the creation of new jobs. The average annual income per capita amounts to USD 1,050, and the Human Development Index (HDI) classifies Senegal as “poor” with an index value of 0.485.<sup>2</sup>

4. The agricultural sector made up approximately 34 percent of GDP growth in 2015, a year which benefited from a good rainy season with various government programmes supporting rice production and horticultural value chains. Approximately 72 percent of households in the country are involved in farming. Currently, approximately 70 percent of grain consumption (based on millet, rice, corn, wheat) comes from imports, which makes the population vulnerable to price fluctuations on the international market. The net rate of enrolments in schools<sup>3</sup> and school attendance<sup>4</sup> in Senegal is very low. Between 2010 and 2014, only 84 percent of Senegalese girls and 78 percent of boys were enrolled in primary school (Table 1). School attendance rates from 2009 to 2014 were only 66 percent for girls and 63 percent for boys. Moreover, only about a third of Senegalese children progress to secondary education (school attendance from 2009 to 2014 represents only 37 percent of girls and 39 percent of boys).

**Table 1: Education and literacy rate in Senegal, 2010–2014**

Indicators	School year	Gender	%
Youth (15–24 years) literacy rate (%)	2009–2014	Young men	74
		Young women	59
Primary school – gross enrolment (%) <sup>a</sup>	2010–2014	Boys	70
		Girls	76
Primary school participation, net attendance ratio (%)	2009–2014	Boys	63
		Girls	66
Secondary school – net enrolment (%) <sup>b</sup>	2010–2014	Boys	N/A
		Girls	N/A
Secondary school participation, net attendance ratio (%)	2009–2014	Boys	39
		Girls	37

Source: UNICEF, 2016. <http://data.unicef.org/resources/state-worlds-children-2016-statistical-tables/#>.

<sup>a</sup> Primary school gross enrolment ratio – Number of children enrolled in primary school, regardless of age, expressed as a percentage of the total number of children of official primary school age. UNICEF, 2016. <http://data.unicef.org/resources/state-worlds-children-2016-statistical-tables/#>.

<sup>b</sup> Secondary school net enrolment ratio – Number of children enrolled in secondary school who are of official secondary school age, expressed as a percentage of the total number of children of official secondary school age. Secondary net enrolment ratio does not include secondary school-age children enrolled in tertiary education owing to challenges in age reporting and recording at that level.

<sup>2</sup> World Bank, 2016. [www.worldbank.org/en/country/senegal/overview](http://www.worldbank.org/en/country/senegal/overview).

<sup>3</sup> Number of children enrolled in primary school in the age group corresponding to primary education divided by the total population in the same age group.

<sup>4</sup> Percentage of children in the age group that officially corresponds to primary school-age children who attend primary school.

(See primary and secondary school net attendance ratio.) UNICEF, 2016. <http://data.unicef.org/resources/state-worlds-children-2016-statistical-tables/#>.

5. **Poverty, vulnerability and food security.** Senegal has significant regional disparities with respect to human development indicators. In the region of Kédougou, 56 percent of the population is poor and 33 percent lives in a state of food insecurity. The above-mentioned education indicators, such as enrolment and school attendance rates, are even lower in the region of Kédougou.<sup>5</sup> Much of the country is located in the Sahel region, which is characterized by a semi-arid climate and is vulnerable to climatic change. According to WFP, the nutritional problems of Senegal are probably a consequence of drastic climate change that has affected the country over the last decade. Whereas in 2006, 2007 and 2011 severe droughts affected the country, in 2009 Senegal suffered from flooding. Overall, because of these events about 800,000 people have faced problems of food insecurity.<sup>6</sup> Generally, in the countries of sub-Saharan Africa, women constitute between 60 and 80 percent of the labour force employed in agricultural food production and income (FAO, 1984); Senegal is no exception to this trend. Women's strong contribution to food production is predominant in all regions of the country. Any programme to combat food insecurity must be largely focused on women. Further, the agricultural component of PAA Africa Senegal focused on promoting the empowerment of women. The extent to which the project is actually aligned with this policy line is an essential component of the evaluation.
  6. **Anchoring of PAA Africa Senegal in the educational and agricultural policies of Senegal.** In June 2015, PAA Africa in Senegal was approved at the national level by way of a letter from the prime minister, which strengthened the programme and contributed to the registration of PAA in the Senegalese government's "Triennial Plan for Investments Priorities" (PTIP) having a budget of 22 billion CFA francs for the years to come (1 billion CFA francs in 2017, 2 billion in 2018 and 19 billion in 2019). This process was supported by FAO and WFP through knowledge-sharing activities (such as workshops) and by carrying out assessments on the potential for scaling up. A substantial expansion of the programme is planned for the 2017–2019 period, at which time PAA Africa shall be consolidated throughout the region of Kédougou and extended to three regions in Casamance and two regions of Vallée du Fleuve and Saint-Louis.
- PAA Africa in Senegal is implemented in coordination with the National School Food Policy, implemented by the Ministry of National Education with support from WFP. Since 2014, the Senegalese Government has studied the implementation of a development of school canteens plan under the National School Food Policy. National authorities have established PAA's Technical Committee, a national coordinating body for PAA Africa in Senegal. The committee is chaired by the Executive Secretariat of the National Food Security Council (SE-CNSA), which reports directly to the prime minister of Senegal.

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<sup>5</sup> WFP, 2014. Global Analysis of Vulnerability, Food Security and Nutrition (AGVSAN).

<sup>6</sup> World Bank, 2016. [www.worldbank.org/en/country/senegal/overview](http://www.worldbank.org/en/country/senegal/overview).

## **Overview of the evaluation**

7. **Areas of implementation of PAA Africa Senegal.** PAA Africa Senegal's consolidation phase, the subject of this report, is a joint initiative of FAO and WFP, with increasing involvement of the Senegalese Government, including the Ministry of National Education through the Department of School Canteens and the Ministry of Agriculture and Rural Equipment (MAER). In the consolidation phase (or phase II), the support to production component was implemented in three districts of the region of Kédougou: Bandafassi, Dar Salam and Fongolimbi. Within these districts, three unions of farmers were chosen as beneficiaries of the programme (producers' unions at Bandafassi, Dar Salam and Dimboli); these unions are made up of economic interest groups (*groupement d'intérêt économique*, GIE), a form of primary cooperatives in Senegal.
8. **Objectives and components of PAA Africa Senegal.** In response to food insecurity aggravated by recurrent drought, PAA Africa Senegal aims to increase agricultural productivity by providing training and inputs to small farmers and linking production to regular and stable institutional demand for providing food in schools. Monitoring was conducted on the basis of data collected by implementing partners and by a consultant from the International Policy Centre for Inclusive Growth (IPC-IG). The progress of the programme has been measured for three of its components by using indicators contained in the logical framework of the project document. PAA Africa Senegal's main activities were divided into three components: (i) increase in rice production and incomes of beneficiary households under the guidance of FAO; (ii) improved coverage of needs for rice in school canteens, supported by the project through local agricultural production under the overall coordination of WFP; and (iii) capacity development of the government, at both national and regional levels, to improve national purchasing programmes for food from smallholder farmers through technology transfers, advisory services and input supply.
9. **Beneficiaries of the project.** Phase II is expected to assist 1,000 farmers and 180 schools providing production support, capacity development, and the distribution of meals prepared with local products for approximately 23,000 students. In phases I and II, the only crop that has been incorporated in the programme in Senegal was rice. In exchange for receiving contributions in the form of agricultural inputs from FAO, farmer organizations have committed to annually selling part of their rice harvest to PAA Africa at the rate of 250 kg of rice per beneficiary. Three farmer unions have been selected to benefit from the PAA programme: producers' unions in Bandafassi, Dar Salam and Dimboli. In total, 30 GIEs were targeted to receive inputs and technical assistance by FAO. Within each producer union, GIEs ought to have been selected on the basis of special selection criteria; for example, for being located geographically in villages affected by the drought of 2010–2011 and having no access to other agricultural projects supporting rice production.
10. **Realization of almost all project activities.** As stated in the IPC-IG PAA Africa Midterm Monitoring Report Draft of February 2016, on the whole, almost all the programme's activities have been implemented and almost all objectives have been reached as planned. In terms of production support, storage warehouses have been

made available to three producers' unions, as have inputs (fertilizer, seed, rice) and agricultural equipment (tractors, threshers) that were supplied to the producers and their unions. The introduction of these production factors, strengthening of producer organizations' capabilities and guaranteeing marketing opportunities should lead to a sharp increase in the beneficiary producers' cultivated areas, yield and production of paddy rice. From a nutrition standpoint, 34,045 students from 180 different schools should receive meals prepared with rice grown by producers benefiting from the PAA Africa Senegal. Activities, products and expected results of the programme are described in detail in PAA Africa's logical framework attached as Annex 5.

11. **Logical framework of PAA Africa Senegal.** The logical framework on which the project is assessed was developed by FAO, country offices and WFP Headquarters at the time the project was created (Annex 5). The evaluation team used numerous logical framework indicators, but supplemented them with other indicators. Given the importance of school feeding in this project, one of the expected results should be providing education on a varied and balanced diet.<sup>7</sup> The food for school programme should be a means for students to learn to "eat properly" and adopt proper eating habits to lead a healthy and active life.<sup>8</sup> It is also important to include the monitoring of effective dietary rations that are actually served to students and education on a proper diet in the project's activities. These issues were reviewed by the evaluation team.
12. **Project stakeholders.** Many participants have been stakeholders in the project from the time of its conception or from the time it was implemented. The Ministry of Agriculture and Rural Equipment and the Ministry of National Education are the main institutional partners of PAA Africa Senegal. FAO and WFP, in collaboration with the decentralized services of these ministries, are responsible for the implementation of the project. The performance of the project has involved partnerships with the following structures: (i) the non-governmental organization Action Group for Community Development (GADEC), for production support; (ii) the Base Support Methods and Techniques for Agriculture, Rural Activities and the Environment (BAMTAARE), for IPPM training and a baseline study; (iii) the Agency for the Development and Management of Small and Medium Enterprises, ADPME, for capacity development of financial management, organizational dynamics and asset management; and (iv) the non-governmental organization PAPIL, for monitoring harvests and marketing. The state's decentralized departments were also involved in the implementation of the project, including the Regional Directorate of Rural Development (DRDR) of the Ministry of Agriculture and Rural Equipment (Ministère de l'Agriculture et de l'Équipement Rural), the School Inspectorate and the Inspectorate for Education and Training (IEF) of the Ministry of National Education responsible for canteens, and local government (governors and sub-prefects).

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<sup>7</sup> S. Maxwell & M. Smith (1992). Household Food Security: A Conceptual Review. In S. Maxwell and R. Slater (2003). Old and New Food Policy. *Development Policy Review*, 21 (5–6): 531–553.

<sup>8</sup> WFP (2013). Policy revision with respect to food in schools. Innovation to promote programmes being taken on by countries, and the FAO (1996) Rome Declaration on World Food Security. Rome, FAO.

**13. Gender dimension of the project.** One of PAA Africa Senegal's core dimensions lies in its commitment to provide gender equality and women's empowerment. As discussed in the following subsection, the evaluation team sought to determine to what extent this goal has been achieved.

### **Key findings**

PAA Africa Senegal's consolidation phase would raise several challenges:

- increasing rice production and incomes of beneficiary households;
- improving coverage of school canteens' rice needs;
- capacity development of small farmers through technology transfer, provision of advisory services and input supply;
- supporting 1,000 farmers by providing production support and capacity development;
- distributing meals prepared with local produce to approximately 23,000 students in 180 schools; and
- ensuring a strong involvement of local stakeholders and the private sector in the implementation of the project (PADER, PAPIL, SODEFITEX DRDR, SDRDR, School Inspectorate and the Inspectorate for Education and Training, etc.).

### **Evaluation methodology and its limitations**

14. The evaluation criteria and findings are presented in the form of answers to the questions set out in the evaluation matrix, attached in Annex 2. It helped organize questions and sub-questions that have been identified, but also helped to choose the most appropriate method to collect data. The main evaluation criteria that have been applied are relevance, effectiveness, impact, efficiency and sustainability.
15. With the relevance criterion, we considered whether the three districts selected by the project were highly vulnerable to food insecurity and a low level of education, and considered whether they were characterized by high levels of poverty compared to other districts. We assessed whether PAA Africa Senegal's objectives coincided with the needs of beneficiaries, those of the country and those of donors. This criterion led to a logical evaluation of the project's alignment with the Senegalese Government's policies on food for schools, primary education, social protection and agriculture. Similarly, the project's compliance with WFP's and FAO's main objectives and strategies in Senegal has been analysed.
16. The effectiveness criterion was applied to three areas: education, agriculture and behavioural change. With respect to education, we considered whether the project allowed for effective community participation in managing food in schools, whether

the programme improved the capacity for managing food in schools by the schools themselves, and whether their bargaining power with different suppliers (farmers' organizations, traders, etc.) has been strengthened. We also assessed whether the project has allowed children of beneficiary schools to have regular access to meals in accordance with national food standards. With respect to agriculture, we considered the participation levels of men and women in the project by checking if the project has actually benefited smallholders and provided them with stable markets for their products. The evaluation team checked whether smallholders had increased their production capacity and marketing, whether their yield per hectare had improved, and whether their professional organizations had increased their capacity, namely by providing more negotiation assistance.

17. The impact criterion focused on project impacts. Has the project increased the academic performance of children beneficiaries in terms of increased enrolments in schools and successful completion of the primary level completion certificate (CFEE),<sup>9</sup> reduction in repetition rates and school drop-outs? It was also checked whether the programme had significantly improved the nutritional status of beneficiary children. Finally, special attention was paid to behavioural changes caused by the project. Three areas have been identified: local organizations, participating districts and gender (did the project provide more decision-making power to women involved in managing food in schools?).
18. With the efficiency criterion, the evaluation team examined how PAA Africa Senegal used the least amount of resources possible to produce the desired outcomes. It compared the effectiveness of the project with the Government of Senegal's school canteen programme. The cost of increasing a small farmer beneficiary's productivity to a ton per hectare has been considered as well. These unitary costs were compared to other agricultural programmes in Senegal. Effectiveness of the project's producer payment mechanism by WFP was assessed by looking at payment delays. The regularity of food distribution to the beneficiary schools was also examined. The possible existence of access barriers having limited small farmers' participation in the project has been examined, too.
19. Sustainability is the last evaluation criterion applied to PAA Africa Senegal. We sought to understand whether farmer organizations continued to integrate into the market, and whether the Ministry of National Education could substitute WFP in financing beneficiary school canteens at the end of the project, maintaining the quality standards obtained by WFP. We also sought to determine whether the contractual relationship between school canteens and the project's beneficiary farmer organizations were likely to be maintained following the end of the project, or whether the possible improvement of small farmers' productivity would continue on after the end of the project. We also looked at whether and how the socio-economic situation generated by the project could be improved, and whether it would be maintained after the withdrawal of FAO and WFP. The ability to learn from its mistakes and success

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<sup>9</sup> The certificate of completion of elementary education (CFEE) is a national diploma awarded by the Ministry of National Education. It marks the end of primary education, which lasts for six years in Senegal.

dramatically influences a project's chances of achieving its goals; we consequently examined whether the lessons learned in the first phase had been taken into account in the second. Finally, the extent to which the project has incorporated lessons learned from its first and second phases was examined with respect to the current proposal to extend PAA Africa Senegal's gambit.

20. **Quantitative data collection.** Quantitative data were collected in the districts where the project took place, as well as from staff from WFP, FAO and the Senegalese Ministries of Education and Agriculture. The evaluation team examined the quantitative data from the survey on food security conducted in 2013 by the Executive Secretariat of the National Food Security Council in order to compare the beneficiary districts of the Kédougou region with the rest of the country. This survey provided information such as the level of household food insecurity (average, moderate or severe), the nutritional status (age, weight, height) of children under five years of age, and the number of meals usually provided on a daily basis during the school year in the household (with a distinction between adults and children). Secondary education data were collected from the database (StatEduc) of the Directorate of Planning and Education Reform. This database provided information on the characteristics of school enrolment and school attendance, drop-outs, repetitions, etc. The evaluation team also used the database of the School Canteens Division to compile an updated list of schools having a canteen in the districts where the project took place and in the control district. Collected secondary data were broken down in order to obtain, for each criterion, indicators distinguishing men from women and girls from boys.
21. **Qualitative data collection.** Two methods were used to collect qualitative data. First, individual interviews were conducted with principals, teachers, GIE officials, a GADEC representative, a PAPIL representative, a National Council for Dialogue and Cooperation with Rural Areas (NCRC) representative, WFP staff representatives, the head of the DRDR to Kédougou, FAO staff members, Ministry of National Education officials, officials from Senegal's office of the prime minister, and representatives of union presidents and producer GIEs. Second, focus groups were organized. The number of 20 focus groups provided in the terms of reference (four target groups to be interviewed in each district and five districts to be covered, see Annex A3.1) was reduced in order to comply with the timeframe required for the evaluation team to carry out a field visit. To this extent, four districts (one control district) were selected and the number of focus groups was reduced to 14. Similarly, individual interviews were conducted with men and women. WFP's country office recruited three local facilitators for the evaluation team that could speak the main languages spoken in the districts visited by the evaluation team. They helped consultants conduct individual and group interviews. Both individual discussions and those had with groups were recorded. A translator was hired to transcribe these discussions into French files. The systematic and inevitable use of interpretation significantly extended the time taken for data collection and translation.
22. **Data triangulation.** The checking and cleaning of data was carried out by the evaluation team to ensure good quality. The consultants conducted a systematic triangulation of data, which was used to exploit different sources of information and

maximize confidence in the obtained findings. Triangulation also helped ensure consistency of answers and highlight the similarities and differences of points of view. The completeness and reliability of the findings has been strengthened.

**23. Sampling framework.** Without a quantitative survey, a rigorous evaluation of the project's impacts was not possible. Fortunately, reliable data were available for public primary schools in the Ministry of National Education's StatEduc database. By taking this opportunity, the evaluation team used non-experimental methods to analyse the educational effects of the project. All public primary schools in rural areas of the three departments where PAA Africa Senegal was operating were extracted from the database. A treatment group and two control groups were constructed (Annex 11). The treatment group consists of primary school beneficiaries of the PAA Africa Senegal project. The first control group consists of primary schools: (i) belonging to the same districts as those in the treatment group; (ii) not having a school canteen; and (iii) having the same characteristics of schools in the treatment group. The second control group differed from the first in that the schools had a school canteen not supported by the PAA Africa Senegal project or any other ongoing WFP programme. Data from 2011, the year before the start of the project, were used for the construction of the three groups. A total of 180 schools were formed using these criteria in order to draw the three groups of schools.

**24. Methods.** Descriptive statistics, matching propensity scores in combination with double differentiation were used. Descriptive statistical tools were used to analyse quantitative data and highlight key trends. Matching techniques were used to establish the study's schools groups and assess the impacts of canteens on educational performance. The counterfactual approach of causality was used to answer the main research question: What would be the results if the project's beneficiary schools had not participated in PAA Africa Senegal's project? By using the matching of propensity scores method (MASP), the beneficiary schools and non-beneficiary schools with similar observable characteristics were matched. This method reduces the selection bias faced by the estimated impacts of a project implemented without an experimental system to evaluate them. The MASP estimates were supplemented by stress testing to check the reliability of the findings (Annex 11). Data across the three groups of schools were available for the years 2012 and 2016, which allowed for the application of the double difference method to estimate the average impact of the project on the academic performance of PAA Africa Senegal's beneficiary schools. This method allows unobservable heterogeneity between the treatment and control groups which are time invariant to be checked.

**25. Taking into account the gender aspect of the methodology.** A transversal approach has been adopted to address gender issues. First, the gender-specific orientation of the programme has led the evaluation team to examine in depth the project's efforts to increase gender equity. It documented specific measures (training on gender issues, gender-specific indicators, etc.) applied by the project to ensure gender equality. Second, data analysis looked for similarities and differences between the sexes in the process and in the governance of school canteens or beneficiary producer organizations. Third, the evaluation team examined the distribution of

project benefits between men and women, boys and girls. The analysis of behavioural change has also highlighted the differences between men and women, or boys and girls. Annex 10 provides a detailed list of indicators broken down by gender.

- 26. Timing and location of data collection activities carried out by the evaluation team.** Data collection took place between 15 October and 7 November 2016. During the first week, meetings were organized in Dakar with the project partners. Consultants then stayed in the Kédougou area during the second and third weeks. Three beneficiary districts of the PAA Africa Senegal project (Bandafassi, Dar Salam and Dimboli) and a non-beneficiary district (Khossanto) were selected for visits to the project's beneficiary and non-beneficiary schools and producers. The consultants met with the governor, the school inspector and the head of the DRDR of the Kédougou region, as well as with mayors and sub-prefects of towns and the districts that were visited. Fifteen individual interviews (Annex 11) were conducted in Dakar, Kédougou and Tambacounda with project partners and national and local authorities (FAO, WFP, School Canteen Division of the Ministry of National Education, Food Safety Division, Social Protection Division, SODEFITEX, PADAER, PAPIL, DRDR, GADEC, School Inspectorate). In total, fourteen focus groups were organized, of which there were four with students (mixed, both men and women), four with mothers who prepared meals in school canteens, and six with small rice producers that included two focus groups with men and women, two composed exclusively of men and two composed exclusively of women. In the districts, individual interviews were conducted with 21 school principals and teachers, eight GIE presidents (a man and a woman in each district), and four union presidents of producers (Table A3.1, Annex 3). The fourth week was spent in Dakar and was devoted to data analysis and debriefing.
- 27. Limits of the evaluation.** Since the consultants did not speak the local languages, it was necessary to use an interpreter. This increased the length of focus group discussions and individual interviews, and slowed the flow of the conversation. Generally speaking, the evaluation team did not encounter major difficulties applying the gender-specific approach adopted by the evaluation team. The use of official secondary education data enabled indicators for men and women to be created. The main challenges the evaluation team faced were related to secondary agricultural data because there was not enough information for comparisons between men and women producers. For example, data were not available for producers in non-beneficiary districts or areas of the PAA Africa Senegal project. To address the lack of data on non-beneficiary producers, the analysis focused on the development of indicators relating to project beneficiaries. The analysis also used data from the baseline survey conducted in 2011 before the project started to get an idea of the socio-economic situation and the yields of non-beneficiary producers.
- 28. Quality assurance procedures.** Several quality assurance procedures have been implemented. First, for data processing, different methods were used to test the reliability of the findings in addition to triangulation. For example, three matching techniques (kernel, nearest neighbour and radius) were applied to identify, in each of the two categories of non-beneficiaries of the PAA Africa Senegal programme, schools

having characteristics as closely matched as possible to those of the 85 beneficiary schools. Then, the quality of the match that was obtained using these three methods was checked using two statistical techniques (pseudo R<sup>2</sup> and standardized mean absolute bias reduction).

**29. Ethical considerations.** Strict confidentiality rules have been defined and implemented. Before each individual meeting, the following undertaking was read out: "We want to assure you that your comments will remain confidential. If we wish to quote an opinion that you have provided, we shall ask you for your express permission." Prior to the discussion of each focus group, the following text was read to the participants: "To ensure the smooth running of this discussion, we invite you to show respect when the other participants are engaging. We also want everyone to feel comfortable to express themselves, and we ask you not to reveal anything about the opinions that another participant has expressed during the discussion. Everything that is said in our discussions today will stay in the group. This will help to preserve the confidentiality of everyone, to ensure everyone can speak freely and have an informative discussion." The recorded interviews are preserved according to safety standards used at the *Consortium pour la Recherche Économique et Sociale* (Consortium for Economic and Social Research) (CRES) and which were approved in 2015 by the firm KPMG Fund running the Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) programme of the Department for International Development (DFID), which supports a CRES project. No ethics issues were encountered by the evaluation team in the performance of its duties.

### Key findings

- Evaluation criteria that were applied: relevance, effectiveness, impact, efficiency and sustainability.
- Evaluation findings are presented in the form of answers to the questions set out in the evaluation matrix attached in Annex 4.
- Quantitative and qualitative data were collected from secondary sources and collated from conducting 14 focus groups and 33 individual interviews.
- Data triangulation.
- Taking into account the gender dimension in the methodology and compliance with ethical standards.
- Applied methods: descriptive statistics, matching propensity scores in combination with double differentiation.

## **2. Evaluation results**

The applied evaluation criteria are relevance, efficiency, effectiveness, impact and sustainability. Annex 3 contains the questions that the evaluation team sought to answer. The results of the analysis are presented on a criterion by criterion basis.

### **2.1 Evaluation criteria 1: Relevance**

- 30. The socio-economic development of the Kédougou region is slower than the rest of the country.** The relevance of the PAA Africa Senegal project may be considered from the angle of checking whether the Kédougou area was well suited to a project that seeks to act positively on both poverty and primary education for children. Besides poverty and food insecurity, primary education and alignment with national policies were the factors used to assess whether the implementation of the project in the Kédougou region was properly substantiated.
- 31. Kédougou is one of the poorest regions of Senegal.** The poverty rate is estimated at 71.3 percent in 2011 against 46.7 percent for the national average (ANSD, 2011). Moreover, in 2012, a large proportion of households in this region was unable to meet their basic food needs. The prevalence of food insecurity had reached 33 percent, which is well above the 18.8 percent national rate (SE-CNSA, 2013). However, wide disparities remain between the three departments in the region. Table 2 shows that the Kédougou departments (48.4 percent) and Salémata departments (46.5 percent) are the most affected by precariousness and vulnerability. Several factors may explain this food insecurity, among which we find low rainfall in the 2011/2012 crop year, which negatively affected the production of small farmers. However, the Saraya department is less impacted by food insecurity with a prevalence rate of 18.3 percent, slightly below that of the country (18.8 percent). The Saraya anomaly is due to the fact that this is the area that houses the most important gold sites in the region and most of the population derives substantial revenue from the exploitation of gold.<sup>10</sup> The choice of Kédougou to host the PAA Africa programme in Senegal made by WFP and FAO is therefore justified by the high level of food insecurity that creates difficult learning conditions for schoolchildren in the region. Other socio-economic indicators reinforce the appropriateness of the Kédougou region for the PAA Africa Senegal project. The prevalence of malnutrition among children aged between 0–59 months had in fact reached a relatively high proportion (Table 3). A chronic malnutrition rate, which is determined by the index height-for-age, was 24 percent against the national 16.5 percent, with a difference of 7.5 percentage points. With respect to the education of the population aged 10 and over, the indicators show a low level of literacy with a rate of 33.3 percent compared to

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<sup>10</sup> Although the Saraya district is not a PAA Africa Senegal beneficiary insofar as it does not receive support for production, some schools (about 42) received rice from the PAA Africa programme.

42.4 percent for the national average. Illiteracy affects more women (76.2 percent) than men (57.4 percent).

**Table 2: Prevalence of the food insecurity rate, Kédougou, 2012**

	Prevalence rate (%)	Insecurity level
Department of Kédougou <sup>a</sup>	48.4	High
Department of Salémata <sup>a</sup>	46.5	High
Department of Saraya <sup>a</sup>	18.3	Medium
Kédougou region <sup>b</sup>	33.0	High
National level <sup>a</sup>	18.8	Medium

<sup>a</sup> National Survey on Food and Nutritional Security, SE/CNSA (2013).

<sup>b</sup> Global analysis of vulnerability, food security and nutrition, WFP (2014).

**Table 3: Indicators of socio-economic status in 2011–2012**

	Kédougou region	Senegal
Chronic malnutrition rate of children under 5 years (%) <sup>a</sup>	24	16.5
Literacy rate of the population aged 10 years and over (%) <sup>b</sup>		
Women	22.8	37.7
Men	42.6	53.7
Together	33.3	42.4

<sup>a</sup> National Survey on Food and Nutritional Security, SE/CNSA (2013).

<sup>b</sup> Final Report of the General Population and Housing, Agriculture and Livestock Census (ANSD, 2013).

**32. Low productive capacity of rice producers.** Three months not covered by production often coincide with the hunger gap where poor households are forced to resort to various coping strategies such as taking on debt or soliciting help from parents to meet their food requirements. The baseline study on the status of the area of operations for the PAA Senegal programme has provided valuable information on the productive capacity of small producers (Table 4). Before the advent of the PAA programme, the average area planted with rice was about 0.62 ha per farmer. The low portion of cropped land in these areas can be explained by the limited capacity of small producers to develop suitable low-lying areas for rainfed rice, and their ability to find good quality seeds to plant large areas of farmland. Similarly, small producers lack the agricultural equipment required to develop large areas, as evidenced by the lack of tractors and post-harvest equipment such as headers and threshers before the start of the project. The use of traditional cultivation techniques and rudimentary means of production was still on the rise with only 4 percent of households being well

equipped with seed planters and 3 percent with rotary hoes. The rate of draught power was also low since it represented only 46.18 percent of households; this suggests that a significant proportion of farmers do not even have animals for agricultural work. Faced with this situation, they are forced to rent or borrow equipment to save their annual crop. Their capacity for production was also limited by the relatively low levels of use of chemical or organic fertilizers. Just over one half of households used NPK (nitrogen, phosphorus, potassium) fertilizers, while urea was applied by 47 percent of rice farmers.

**33. Low rice yields.** In a region where agriculture is the main economic activity of the labour force, the strong presence of illiterates may hamper the development of agricultural activities (FAO and BAMTAARE/SODEFITEX, 2012). The main crops grown in the region are rice, maize, sorghum and fonio. The results of the baseline survey for the PAA Senegal programme show the weakness of paddy rice yields. Income from agricultural production barely covers expenses related to food, education and health for households (Table 4). With an average yield of less than 1 mt per hectare (0.838 mt), farming households have great difficulties in covering their cereal needs throughout the year. In 2012, the average coverage rate of estimated cereal requirements was 75.87 percent, or 9 out of 12 months. However, it should be noted that only 24 percent of farm households have sufficient coverage of needs.

**Table 4: Indicators of the production capacity of small producers targeted by the PAA Senegal programme, 2011/2012**

Indicators	PAA Senegal area	Kédougou region
Average rate of coverage of cereal needs (%)	75.87	
Number of months covering estimated cereal needs	9.1	
Average area sown with rice per farmer (ha)	0.62	
Average yield of paddy rice production (kg/ha) per household	838.44	1 714
Average rate of animal traction (%)	46.18	
Average income of paddy rice production (CFA francs) per household	116 231	

*Source:* Baseline report for the PAA Senegal project in the Kédougou region, FAO and BAMTAARE/SODEFITEX (2012).

**34. Development of education is slower than the national average.** Another area where the relevance of PAA Africa Senegal's project must be considered is the status of primary education in the Kédougou area in the early 2010s. Enrolment, school dropout and repetition rates were compared to the national average to identify gaps in terms of primary education. The percentage of new entrants to

the first grade of primary school, that is to say, the introductory course (CI), was used as a proxy to measure enrolment. On average, and specifically in 2011, the overall enrolment rates among new school starters is almost equal to 100 percent (99 percent for girls against 99.05 percent for boys) for primary schools in the Kédougou region. The same trend is observed at the national level, but with slightly higher rates in Kédougou. The results seem to indicate that the region was not facing a serious problem of child registration prior to the start of the PAA programme. However, in terms of drop-out rates, the figures show that, overall, rates are significantly higher in the Kédougou region when compared to the national average (Table 5). The gender analysis reveals a high prevalence of drop-outs among girls in Kédougou; this contrasts with the national situation where drop-outs are more common with boys. Factors such as household poverty, the long distances that children must take to go to school (particularly girls in rural areas), early marriages and gold panning have caused stable high levels of school drop-outs in the Kédougou region. Finally, primary school repetition rates are at a relatively low level when compared to the rest of Senegal. These low rates are due to the application of the automatic successful completion policy employed by almost all schools in the country, pursuant to a directive from the Ministry of National Education. In conclusion, keeping students in school is the major problem of access to primary education in the Kédougou region, as opposed to the enrolment of children. In addition to the fight against food insecurity among children, PAA Africa Senegal should focus on the prevention of, and reduction of, early school drop-outs as its primary objective in assisting primary education in Kédougou.

**Table 5: Some school performance indicators for primary schools in the Kédougou region and for Senegal, scholastic year 2011**

	Kédougou	Senegal
Enrolment rate (proxy: % of new entrants to the CI) <sup>a</sup>		
<i>Overall</i>	99.03	98.61
<i>Girls</i>	99.00	98.64
<i>Boys</i>	99.05	98.57
School drop-out rate (%) <sup>b</sup>		
<i>Overall</i>	10.0	8.6
<i>Girls</i>	11.2	8.1
<i>Boys</i>	8.9	9.0
Repetition rate (%) <sup>b</sup>		

<i>Overall</i>	2.0	3.50
<i>Girls</i>	1.9	3.50
<i>Boys</i>	2.0	3.60

*Note:* CI = introductory course.

<sup>a</sup> Calculations from the National Statistical Yearbook, DPRE/MEN (Direction de la Planification et de la Réforme de l'Éducation (DPRE/MEN, 2011).

<sup>b</sup> National Report on the status of education (DPRE/MEN, 2011).

**35. Congruence between PAA Africa Senegal and national policies for the development of basic education.** Under the leadership of its ten-year Education and Training Programme and its programme for improving the quality of education (Programme for Improvement of Quality, Equity and Transparency, or PAQUET), Senegal has made significant progress in primary education between 2000 and 2010<sup>11</sup> (Ministry of National Education, 2015). However, besides the fact that not all school-age children go to school, disparities are noted between regions and between rural and urban areas. In some areas, the education gap between boys and girls is very high and drop-out rates are significant. Rural areas have experienced the most marked delays in opportunities for education, which is mainly due to the prevailing poverty and vulnerability. Fighting hunger in school is thus an important aspect of any educational policy, particularly in areas experiencing poverty and vulnerability. The Government of Senegal understood this and introduced food for schools programmes in rural areas since the 1970s. The PAA Africa Senegal programme is justified by the fact that it fits in well with this national policy, the implementation of which has always received support from WFP. The ten-year Education and Training Programme, which covered the period from 2000 to 2012 had foreseen, in its third and final phase, the proliferation of school canteens in rural areas. The 2011 food for schools policy and the general policy statement for the education sector in 2013 have made school nutrition a key pillar for the achievement of universal education goals and for the improvement of the quality of education in Senegal. The PAA Africa Senegal, which ran the food for schools programmes in Senegal for more than four decades, participates in the implementation of the national school lunch programme in a region where the need is particularly acute.

**36. Linkage of PAA Africa Senegal to the national agricultural policy.** Another angle from which PAA Africa Senegal's alignment with national policies must be assessed is its coordination with the Senegal Agricultural Policy. As part of its Accelerated Programme for Agriculture in Senegal (PRACAS), the government has developed a rice growing self-sufficiency programme projected for 2017.

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<sup>11</sup> The data are taken from an official report of the Ministry of National Education in Senegal: "2015 National Review of Education for All: Senegal", May 2015.

**37. Alignment of the PAA Africa Senegal on social protection policy.**

Finally, the PAA accords with the Government of Senegal's social protection policy for poor and vulnerable populations, which implements various programmes for the poor in the form of social transfers and medical assistance to expand access to social protection for the most vulnerable. These programmes include:

- (i) The nutrition project focused on children and social transfers (NETS), which consisted of providing, for a period of three years, financial assistance of 14,000 francs every two months and six months to 50,000 mothers of vulnerable children aged between 0 and 5 years living in poor households.
- (ii) The National Family Security Grants Programme (PNBSF), which is a conditionally granted social safety net to households living in extreme poverty. Each household receives 100,000 francs annually in the form of regular payments of 25,000 francs per quarter. The allocations made by the PNBSF should reach 250,000 households during the first five years with a pilot phase for 50,000 households in 2013.
- (iii) Universal health coverage, which is to expand access to health services for people excluded from formal social protection systems. The strategy focuses on four main areas, namely: the creation of at least one mutual health care in each municipality or rural community of Senegal to heavily subsidize people; the implementation of the new initiatives of free health care for children aged between 0-5 years at health posts and centres; strengthening existing free health care policies; reform of the Institution for Preventive Medicine through the implementation of the 2012-832 decree of 7 August 2012 relating to mutual health insurance.
- (iv) The minimum age programme, allocating a fixed pension for elderly non-beneficiaries of an IPRES (Pension Insurance Institution of Senegal) or the FNR (national pension fund) pension.
- (v) The pension revaluation programme, which consists of making additional transfers to pensioners with very low pensions due to the very small contributions allocated during their working life.

**38. School feeding that draws local food production.** PAA Africa Senegal's experience has shown that the creation of a food for schools system can support the maintenance and integration of populations in the working world and empower women through social investments. The funds that women have managed on their behalf gave them freedom of enterprise and enabled them to make decisions in their homes.

**39. PAA Africa Senegal is part of FAO's and WFP's strategies and action plans in Senegal.** PAA Africa is in line with FAO's and WFP's different strategies and action plans, as it will be explained below. FAO and the Government of Senegal laid out their partnership priorities in the jointly formulated Country Programming Framework 2013–2017. The document takes

into account the government's new directions by explaining three priority areas: (i) strengthening the governance of food security, and improving productivity and competitiveness of agricultural products; (ii) sustainable management and restoration of natural resources and the environment; (iii) building resilience by strengthening the system of prevention and management of food and nutrition crises.

40. FAO supports the government's efforts to strengthen the resilience of poor and vulnerable communities through the scaling up of pilot projects in the field of resilience to food security.<sup>12</sup> The PAA project is in line with the first and the third priority areas of the programming framework as well. The implementation of the project allowed farmers to improve their productivity, their food security, and that of households and students of project beneficiary schools.
41. With respect to WFP, the PAA project falls within the framework of its school canteen activities in Senegal. The objectives of WFP's policy on food in schools are: (i) guaranteeing the nutritional quality of food purchased locally; (ii) buying from local, regional or international markets; and (iii) looking for more effective ways to help beneficiaries.<sup>13</sup> The PAA project is in line with these objectives, as rice distributed to school canteens in Kédougou comes from local production and WFP ensures the quality control of the produced rice.

### **Key findings**

- Several economic indicators justify the choice of the Kédougou region for the implementation of the PAA Africa Senegal project.
- The prevalence of malnutrition among children aged 0–59 months had reached a relatively high proportion (Table 3).
- The chronic malnutrition rate, which is determined by the height-for-age index, was 24 percent as opposed to 16.5 percent at the national level, a difference of 7.5 percentage points.
- With respect to the education of the population aged 10 and over, the indicators show a low level of literacy with a rate of 33.3 percent compared to 42.4 percent for the national average. Illiteracy affects more women (76.2 percent) than men (57.4 percent).
- On average, in 2011, the overall enrolment rates among new school starters in the Kédougou region is almost equal to 100 percent (99 percent for girls against 99.05 percent for boys) for primary schools.
- As part of its Accelerated Programme for Agriculture in Senegal (PRACAS), the government has developed a rice-growing, self-sufficiency programme projected for 2017.

<sup>12</sup> Programmes in Senegal. [www.fao.org/senegal/programmes-et-projets/fr/](http://www.fao.org/senegal/programmes-et-projets/fr/).

<sup>13</sup> WFP (2013). Policy revision with respect to food in schools. Promote innovation to facilitate programmes taken up by countries.

## 2.2 Evaluation criteria 2: Effectiveness

**42. Effectiveness criteria.** With the effectiveness criterion, we seek to understand whether PAA Africa Senegal has managed to achieve the pre-set objectives. For its agriculture component, PAA has distributed free inputs to producers, provided training and helped rice farmers access the market. All these activities should lead to an increase in productive capacity for beneficiary producers, a significant increase in agricultural production, food security for households and higher farmer incomes. As a part of its school feeding component, PAA Africa Senegal has set up management committees in beneficiary schools, trained its members, and delivered food. It is expected that: communities will contribute significantly to supplying food to the canteens; the predicted number of beneficiary schools will be reached; students will receive meals of sufficient quality and quantity; and women will actually participate in the management of canteens. We shall assess the extent to which the expected results have been achieved in the project.

### 2.2.1. Agriculture

**43. Beneficiary producers.** In 2012, at the beginning of the project, the number of beneficiary producers was 909. It rose to 1,000 the following year and did not change much in the following years, as it numbered 979 in 2016. The proportion of women producers has always been high, 46 percent and 48 percent, respectively, in 2012 and 2014. However, it dropped during the final year of the project. In total, PAA was able to provide support to 1,000 men and women producers and to a growing number of GIEs whose workforce grew from 33 in 2012 to 57 in 2016 (Table 6). It was not possible to determine the number of GIE beneficiaries made up exclusively of women, but their number increased between the beginning and the end of the project.

**Table 6: Changes to the number of PAA programme beneficiaries, by union and by type from 2012/2013 to 2015/2016**

	2012/2013 <sup>a</sup>			2013/2014 <sup>a</sup>			2014/2015 <sup>b</sup>			2015/2016 <sup>c</sup>			
	GIE	Female	Women	Total	GIE	Women	Total	GIE	Women	Total	GIE	Women	Total
Bandafassi	10	26		232	13		310	9	122	310	13	80	265
Dimboli	8	85		205	18		330	11	145	330	23	179	360
Dar Salam	8	166		269	19		360	8	210	360	21	105	354
Bembou	5	127		134									
Dakately	2	15		69									
Total	33	419		909	50		1000	28	477	1 000	57	364	979

<sup>a</sup> Final Report of the 2013/2014 Agricultural Season (GADEC, 2014).

<sup>b</sup> Final Report of the 2014/2015 Agricultural Season (GADEC, 2015).

<sup>c</sup> Final Report of the 2015/2016 Agricultural Season of the PAA Senegal Project (DRDR Kédougou, 2016).

#### **44. Self-organization and strengthening of producers' GIE capabilities.**

PAA has supported the organization of producers into GIEs and the grouping of producers into unions. During the lively group discussions led by a team of consultants, the producers said they were now better organized, they were trained in the management of organizations, trained in the development of negotiating capacity, and trained in farming crops. According to the president of the Dimboli producers' union: "For organization at the union level, at the start there were five GIEs; today, the union numbers 27 GIEs". Being organized, as expressed by the producers during interviews, helped them to strengthen their capacity to work in partnerships, organize meetings and discuss issues. Moreover, the president of the Dar Salam GIE said: "[...] It was every man for himself, and now we come together, we talk. We have seen that unity is strength; that it is better than everyone working alone growing crops". The president of the Dimboli GIE also added: "The project has trained us in community life and the officers know their roles". The manager of the DRDR in the region of Kédougou has emphasized that he is rarely contacted now for help in the event of problems because producers are better organized within the framework of their GIEs and producers' unions are able to manage their disagreements.

**45. Access to quality inputs.** In addition to organizing producers into GIEs, PAA Africa Senegal has made seed kits and fertilizer available to the beneficiary producers' unions. Table 7 shows the developments in the distribution of inputs for each union that was distributed by the project between 2013/2014 and 2015/2016. The same amounts of fertilizer (25 mt of diammonium phosphate and 50 mt of urea) were distributed to small producers each year. The trend is almost the same for seeds with a distribution of 20 mt per season, with the exception of 2013/2014 when producers of the three unions received only 7.2 mt. The allocation of inputs varies from one union to the next. The Dar Salam and Dimboli producer organizations have received more from the project than those in Bandafassi.

**Table 7: Distribution of inputs distributed by the PAA Africa Senegal programme to each of the unions, agricultural seasons 2013/2014 to 2015/2016**

Union	2013/2014 <sup>a</sup>			2014/2015 <sup>b</sup>			2015/2016 <sup>c</sup>			
	Rice seed (T)	DAP (10-10-20) (T)	Urea (T)	(R1) d *	Rice seed (T)	DAP (15-15-15) (T)	Urea (T)	Rice seed (T)	DAP (15-15-15) (T)	Urea (T)
Bandafassi	1.7	7.75	15.5	-	7.75	15.5	5.3	6.63	13.25	
Dimboli	2.89	8.25	16.5	-	8.25	16.5	7.08	8.85	17.7	
Dar Salam	2.62	9	18	-	9	18	7.2	9	18	

Total	7.2	25	50	20	25	50	19.58	24.48	48.95
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Note: DAP = diammonium phosphate.

\* This relates to rice seed sourced from a wide range of R1 bases initiated by PAA.

<sup>a</sup> Final Report for the 2013/2014 Season (GADEC, 2014).

<sup>b</sup> Final Report for the 2014/2015 Season (GADEC, 2015).

<sup>c</sup> Final Report for the 2015/2016 Agricultural Season (DRDR Kédougou, 2016).

<sup>d</sup> PAA Africa Senegal – Phase II, Midterm Monitoring Report (IPC-IG, 2016).

**46. Increase in surface area cropped with rice.** In order to assist rice producers to increase their rice yields, PAA Africa Senegal made tractors available to their unions. Cropped areas greatly increased thanks to this improvement in their production capabilities. Table 8 shows the status of rice crops and their yields for each producer union from 2012 to 2016. We have noted an increase in the area of land being used, which has more than quadrupled, increasing from 51 ha in 2013/2014 to nearly 245 ha in 2015/2016 (Table 8). Before the start of this project, the area of land being sown with rice by women was less than that sown by men. The project gradually established an equality between the two groups; the average area of land being cropped reached 0.25 ha for both women and men.

**Table 8: Changes to the average areas and yields of union beneficiaries of the PAA Senegal programme in the Kédougou region, 2011/2012 to 2015/2016**

Union	Reference 2011/2012 <sup>a</sup>		2012/2013 <sup>b</sup>		2013/2014 <sup>c</sup>		2014/2015 <sup>c</sup>		2015/2016 <sup>d</sup>	
	Cropped area (ha)	Average paddy rice yield (T/ha)	Cropped area (ha)	Average paddy rice yield (T/ha)	Cropped area (ha)	Average paddy rice yield (T/ha)	Cropped area (ha)	Average paddy rice yield (T/ha)	Cropped area (ha)	Average paddy rice yield (T/ha)
Bandafassi					20.875		25	2.2	66.25	3.11
Dimboli					8.875		12.5	2.1	88.5	3.13
Dar Salam					21.475		25	1.3	90	3.365
Total	0.838		2.5	51	2.9	62.5	2	244.7	3.2	

<sup>a</sup> Baseline Report for the PAA Senegal Project (FAO and BAMTAARE/SODEFITEX, 2012).

<sup>b</sup> Final Report of the 2013/2014 Season (GADEC, 2014).

<sup>c</sup> Final Report of the 2014/2015 Season (GADEC, 2015).

<sup>d</sup> Final Report of the 2015/2016 Agricultural Season for the PAA Senegal Project (DRDR Kédougou, 2016).

**47. Increased production of rice.** The absence of data collected between 2012 and 2016 relating to beneficiary and non-beneficiary producers residing in the project implementation areas and the lack of data relating to comparable characteristics meant that it was not possible to rigorously assess impact on production. Consequently, the analysis is limited to describing production trends between 2012 and 2016. Table 9 shows developments to rice production. If commercialized production for the 2013–2014 season was 100 mt (GADEC, 2015), it reached 581 mt for women producers during the 2014–2015 season, as

opposed to 679.8 mt yielded by men. The opposite was noted for the 2015–2016 season when women's production yields reached 811.05 mt, as opposed to 807.13 mt yielded by men. Over this period, beneficiaries' average paddy rice production almost doubled, from 422 kg to 808 kg. Two factors explain this growth: the first one is an increase in producer prices, the second one is the use of quality inputs and in large quantities due to the project. The free cost of these factors not only reduced production costs, but also cushioned the impact of productivity shocks. In the case of poor rainfall as in 2014/2015 (Graph 2) having a significant effect on production, losses experienced by the producer beneficiaries of the project are limited to costs of labour and fixed capital consumption costs. Reducing this risk encourages farmers to sow more land and increase production.

**Table 9: Changes to socio-economic status indicators and the productive capacity of men and women producer beneficiaries of the PAA Senegal project, 2013/2014 to 2015/2016 seasons**

	2013/2014 <sup>a</sup>		2014/2015 <sup>a</sup>		2015/2016 <sup>b</sup>	
	Women	Men	Women	Men	Women	Men
Average area sown with rice (ha)	0.21	0.19	0.25	0.25	0.25	0.25
Average paddy rice production (in kg)			581	680	811,	807
Average paddy rice yield (kg/ha)			2 324.21	2 719.19	3 244.18	3 228.51
Paddy rice production income (CFA francs)					117 602	117 034
Number of beneficiaries			477	523	364	615

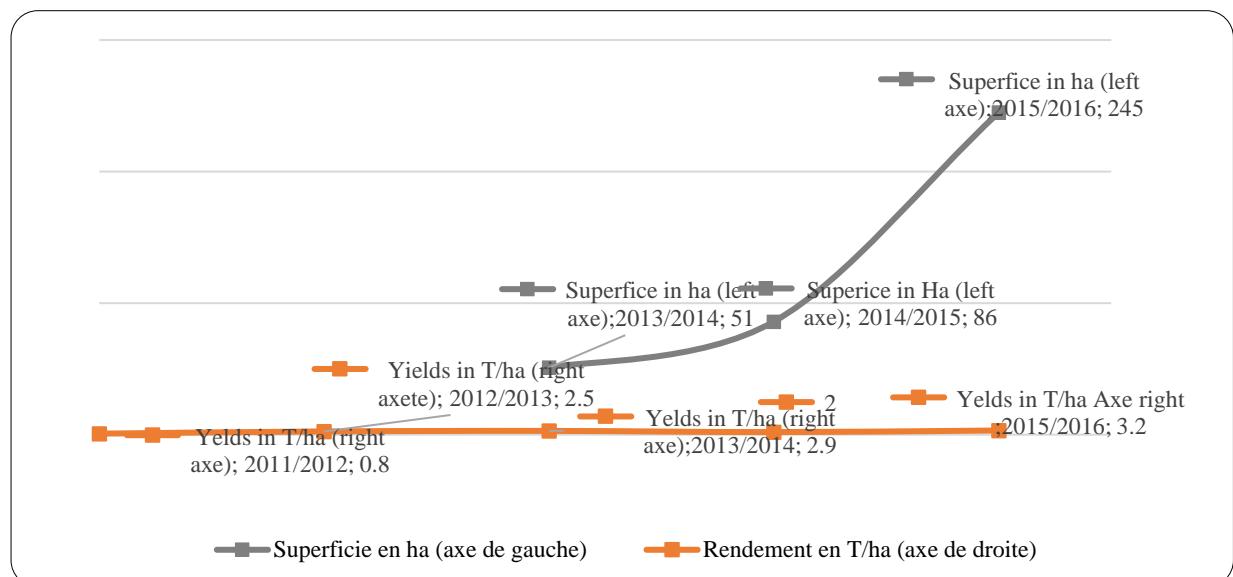
<sup>a</sup> Final Report of the 2014/2015 Agricultural Season (GADEC, 2014).

<sup>b</sup> Final Report of the 2015/2016 Agricultural Season for the PAA Senegal Project (DRDR Kédougou, 2016).

**48. Increase in rice yields.** There is no doubt that the project has a lot to do with the changes observed in the yields of beneficiary producers over the three-year period, especially if compared to previous years when they stagnated at very low levels. The training provided to project partner members of producers' union GIEs and the free access to quality inputs and the use of tractors for sowing large areas are all factors that contributed to the rapid increase in producer returns over the three-year period (Graph 1). Average yields are estimated at 2.5 mt/ha in 2012/2013 against 0.8 mt/ha in 2011/2012, constituting an increase of 1.7 mt/ha (Table 8). With the exception of the decline observed during the 2014/2015

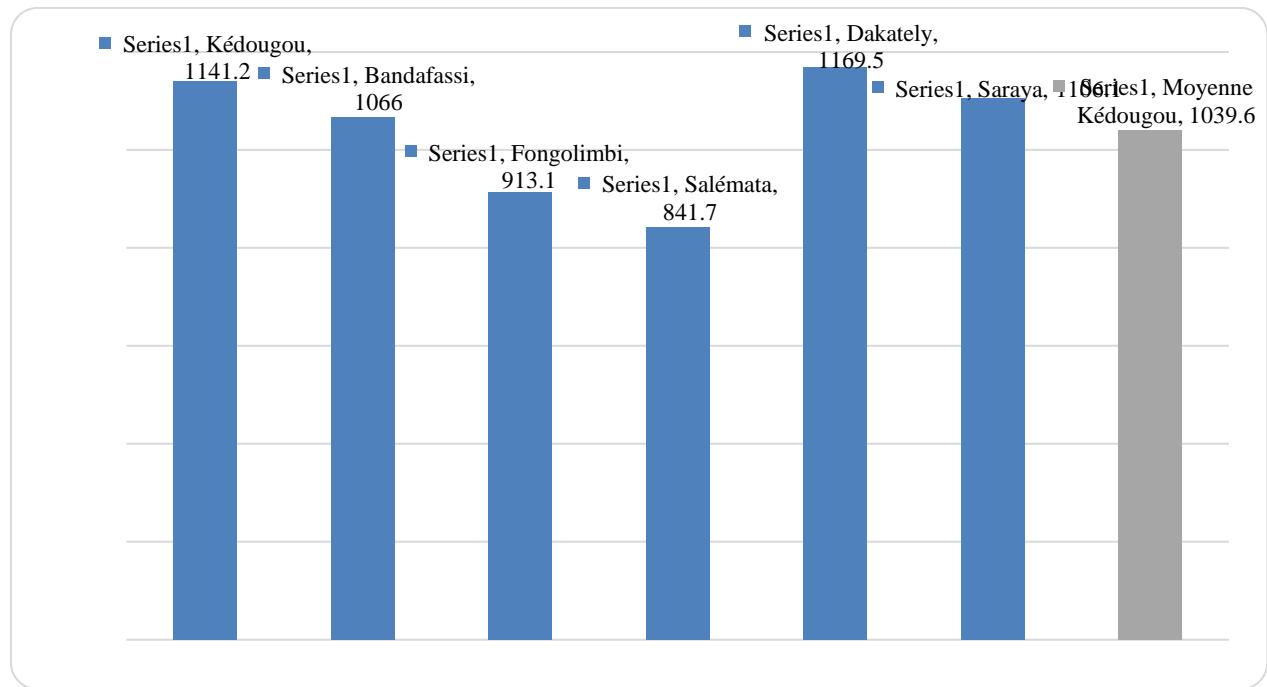
campaign – due to low rainfall (Graph 2) – rice yields have improved significantly over the remainder of the period.

**Graph 1: Changes to the amount of cropped areas (ha) and average yields (T/ha) under the PAA Senegal programme for 2011/2012 to 2015/2016 seasons**



Source: Constructed from Table 8.

**Graph 2: Distribution of rainfall data (in mm) for each location in the Kédougou region, crop season 2014/2015**



Source: Plotted from DRDR Kédougou rainfall data.

**49. The yields of PAA Africa Senegal producers are higher than those of the West Africa Agricultural Productivity Programme (WAAPP) rice projects.** The outputs of the PAA project can be compared to those of the WAAPP. The outputs distributed consist in new improved seed varieties, fertilizer inputs and advice on technical processes. Table 10 summarizes the trends in yields achieved by beneficiaries and non-beneficiaries of new rice varieties or of a System of Rice Intensification (SRI). In 2015, the beneficiaries of the varieties Nérica 6, Sahel 108 and of the SRI produced, respectively, 1,756 kg, 1,728 kg and 2,248 kg per hectare, whereas the non-beneficiaries living in the same areas had an average yield of 1,432 kg per hectare. All these yields are significantly lower than those of the PAA Africa Senegal.

**Table 10: Evolution of yields by beneficiary producers per project area and per year (kg)**

Type of producers		Yields in 2014 (kg)	Yields in 2015 (kg)
Non-beneficiary		1 374	1 432
Beneficiary	Nérica 6	1 797	1 756
	SRI		2 248
	Sahel 108	1 869	1 728
Average		1 564	1 680

Source: Survey (CRES, 2016).

**50. Market access.** In addition to providing support and helping to improve producer returns, another objective of the PAA Africa Senegal project was to enable the purchase of surplus rice from production. To this end, PAA Africa Senegal offered to buy white rice processed by the producers' unions and to redistribute it to school canteens at the schools being supported in the Kédougou region. The price of paddy rice per kilogram offered by PAA Africa Senegal to beneficiary producers is 145 CFA francs, compared to 135 CFA francs on the local market (Table 10). This award is an incentive, not only because it is 10 CFA francs more than the market price, but also because the project freely offers inputs to producers, whereas in the valley producers bear all costs. Diagne et al. (2016) estimated the profitability of grain crops in Senegal in 2014 and 2015, and they found that rice operating expenses account for approximately 70 percent of producer prices. Applying this ratio to the producer price of paddy rice received by beneficiaries of the project in 2015, their unitary income is 44 CFA francs. In addition, the lower production cost means reducing the cost of consumption, which is 101 CFA francs per kilogram of paddy rice, whereas non-beneficiaries of the project must purchase paddy rice on the market at 135 CFA francs per kilogram. Another comparison that can be drawn is between the producer price received by the beneficiaries of the PAA and that applied in the Senegal River Valley located north of the country. The producer price is fixed at 125 CFA francs,

and the costs of transportation to the mill are the responsibility of the producer. Furthermore, contrary to the PAA beneficiaries, the price receives no state subsidy or programme support. Overall, we can consider that the price received by the producer of PAA is very rewarding. However, the price will fall for the 2016–2017 season. Negotiations between SODEFITEX and producers' unions in the Kédougou region were settled by way of an agreement on a producer price set at 135 CFA francs for the 2016/2017 cropping season. In 2015, SODEFITEX bought paddy rice at 145 CFA francs per kilogram. It was assumed that at this price, the mill would operate at a loss.

**Table 11: Evolution of marketing price for paddy rice (CFA francs/kg)**

	<b>2012/2013</b>	<b>2015/2016</b>
Average price of paddy rice sold on the local market (CFA francs/kg)	135	-
Average price of paddy rice sold in PAA beneficiary areas (CFA francs/kg)	-	145
Average price of paddy rice sold in the Senegal River Valley (CFA francs/kg)	-	125

Source: WFP. <http://vam.wfp.org>.

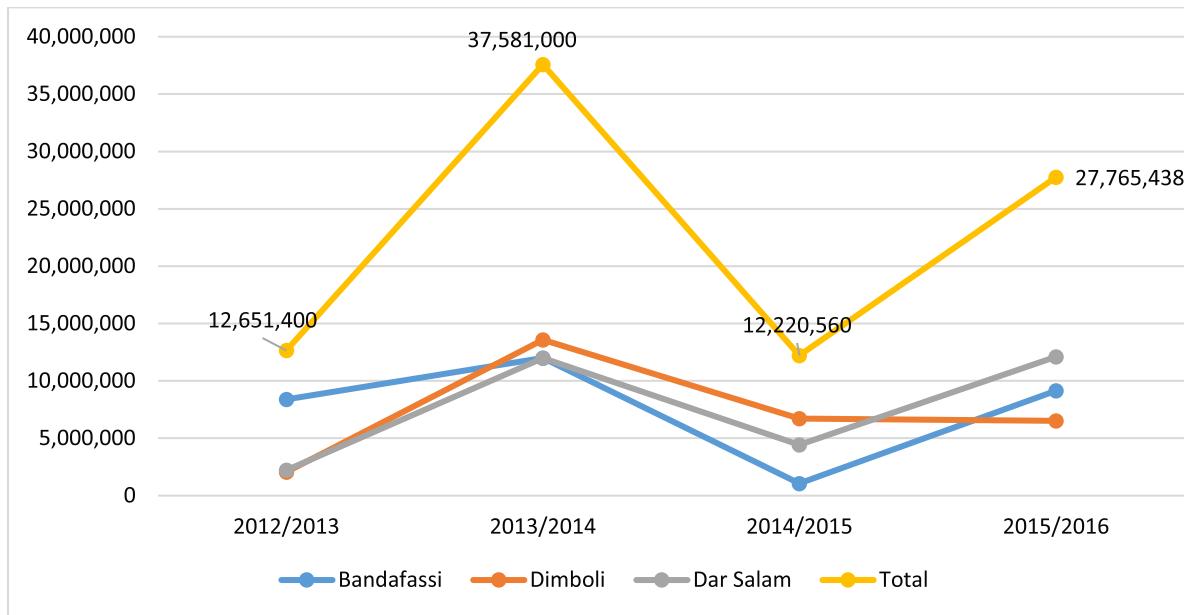
51. **Increase producer incomes.** PAA Africa Senegal offers beneficiary producers a better price. It is higher than the price offered in the river valley of 20 CFA francs and the price of the local market. Participation in the project has allowed producers to increase their income. During the discussions, participating producers claimed that PAA Africa Senegal is beneficial for them, as they manage to consume, sell and keep part of the production for seed. The collected data confirm this assessment. Graph 3 shows that after deducting production expenses from the sales of their surplus, self-consumption increased by 80 percent over the 2012–2016 period. Indeed, it increased from 15,447,900 CFA francs to 27,765,439 CFA francs. However, this increase varies based on the producer's residence area. If it was 9 percent in the locality of Bandafassi, it was multiplied by three in Dimboli and six in Dar Salam (Graph 3). Given the low inflation rate in the country (less than 2 percent per year), real income has increased almost in the same proportion as the beneficiaries' nominal income. Moreover, the average sales income of women is slightly higher than that of men (117,602 CFA francs as opposed to 117,034 CFA francs) for the 2015–2016 season (Table 9). If men had a greater production than women capacity before the start of the project and therefore produced more, PAA Africa Senegal has proved to gradually establish an equality between the two groups. Thanks to more time saved working on soil

preparation and the use of tractors,<sup>14</sup> women were able to improve their performance more than men and obtain more production yields.

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<sup>14</sup> School canteens have also enabled women not to go home at noon to prepare a meal for their children in school. As explained, spare time has been invested into agricultural work, which also contributed to improve women's yields.

**Graph 3: Changes to earnings (after self-consumption) from the sale of white rice by small producers benefiting from the PAA programme**



Source: Final Report of the 2015/2016 Agricultural Season for the PAA Senegal Project (DRDR Kédougou, 2016).

### 2.2.2. School feeding

**52. Community contributions.** The contribution to the operation of the school canteen by the community in which the school is located is a condition PAA Senegal required to be fulfilled to achieve the pre-set objectives. This contribution takes several examples. First, the community is involved in management. Each community, together with the support of teachers, has set up school management committees (CGE). In the event that there is no management committee, schools generally have parents' associations (APE). The role of the CGE and APE is to coordinate the activities of the school canteen. The CGE also takes care of food storage and the daily weighing of food for meals. Upon receipt of food at the canteen, the CGE and APE are informed by the school principal who invites them to come and collect food. The opinion of the Dar Salam principal sums up the opinion of all school officials that were visited: "We have a canteen management committee made up of the community, a teacher and women who prepare the meals. This is the committee that deals with the contribution, preparation and management of the students' food" (Table A3.2, Schedule 3).

53. Another form of community involvement is the preparation of meals by women. Before the start of canteen activities, village women are organized into groups. Every day, a group is responsible for preparing meals for the students. In turn, the women's groups visit the person responsible for the management of the canteen on a daily basis, they receive the food and do the cooking. They then take the meals to the children at around the 13:00 hour. Community participation also comes in the form of donations of food or money to purchase condiments for cooking. This essential contribution to supplement the ration provided by the

project also cushions supply disruptions which may occur in the supply of canteens. In such cases, parents are invited to make contributions by the heads of CGE and APE, who ask them for cash contributions to bridge the gap. Contributions can range from 200 CFA francs to 300 CFA francs per student. They can be monthly or made on a one-off basis as soon as there is a disruption to food supplies. The director of the Habibou Bandafassi school sums up this type of contribution: "Whenever the canteen opens, they participate. If from time to time contributions are exhausted, students give a further contribution of 100 CFA francs. We only receive rice; we must buy ingredients, so money is used to purchase condiments." Teachers at the Dimboli School agreed: "Sometimes there is rice and often it's a long time between checks, but we soon convene a meeting to ask for contributions. The school has 200 students, so it must prepare sufficient quantities, especially on days with more lessons; on Tuesdays and Thursdays breakfast and lunch are provided" (Table A3.2, Schedule 3). In addition to cash contributions, parents make some local food available to the canteen. The most common are peanuts, maize, rice, cowpeas, vegetables and broth. Cereals such as rice and corn are intended to supplement a ration lacking cereal, and the rest of the contributions are for the preparation of the sauce.

54. However, it should be noted that community participation was not always effective, and some problems were reported by teachers. The main problem is the refusal of some parents to contribute to the purchase of condiments. Indeed, when teachers take initiatives to ask the students for contributions, some parents refuse, arguing that WFP should have taken everything into account. The information gap between donors and communities has created situations of misunderstanding between teachers and the parents of students.
55. **Improving students' nutritional status.** An important outcome expected from providing food in schools is an improvement in the students' nutritional status. Hunger and chronic fatigue can be a major barrier to schooling and to the low quality of education received by children from poor households. Making the school a place where children can receive adequate quality food can both encourage their schooling and their retention in school. This can also improve their level of attention and concentration, and thus lead them to better understand lessons. It is therefore important to check whether PAA Africa Senegal has effectively improved the nutritional status of beneficiary students in its schools. Rigorous evaluation would have included anthropometric measurements and measurements of the composition of daily rations actually provided to students. The approach taken by the evaluation team consists of an analysis of the opinions fielded in its individual and group interviews with students themselves, with mothers who prepared canteen food and with teachers. All children and mothers have said that school meals have improved the student's nutritional status, and many children even preferred to eat at school. Moreover, they claim that the portion and quality of food distributed in school canteens are adequate and sufficient.

## **Key findings**

With the effectiveness criterion, we sought to understand whether PAA Africa Senegal has achieved its objectives. Overall, results show good performance for the agriculture component, while the food for schools component has not been a success.

- One thousand beneficiary producers of the PAA Africa Senegal project.
- Self-organization and strengthening the capacity of producer organizations.
- Access to quality inputs.
- Increased areas cropped with rice: the areas more than quadrupled, from 51 ha in 2013/2014 to almost 245 ha in 2015/2016.
- Increased production of rice between 2012 and 2014; beneficiaries' average paddy rice production has almost doubled from 422 kg to 808 kg.
- Increased rice yields: average yields are estimated at 2.5 mt/ha in 2012/2013, as opposed to 0.8 mt/ha in 2011/2012, with an increase of 1.7 mt/ha.
- Market access: PAA Africa Senegal and then SODEFITEX markets for rice production.
- Increased producer incomes: the average sales income of women is slightly higher than that of men (117,602 CFA francs as opposed to 117,034 CFA francs) for the 2015–2016 season.
- Community contribution (in kind and in cash).
- Improving students' nutritional status.
- Halving the number of beneficiary schools.
- Failure to follow the diet.

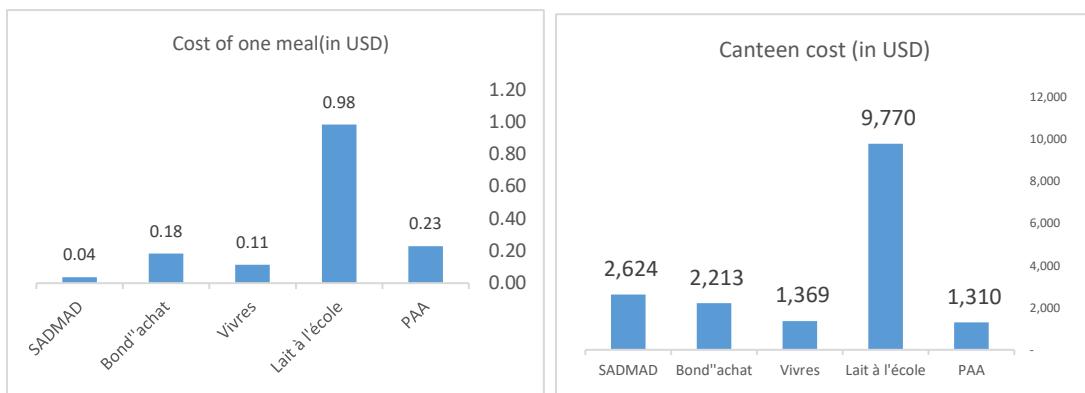
### **2.3 Evaluation criteria 3: Efficiency**

**56. The efficiency criterion.** Efficiency is an economic concept used to measure the performance of a production system and it refers to the non-wasting character of the inputs used by this system (Koopmans, 1951; Debreu, 1951; Farell, 1957). Efficiency analysis is the analysis of the link between inputs and production or the types of resources allocation to production. Efficiency has three components: technical efficiency, allocative efficiency and economic efficiency. A production system is technically efficient if, for a given quantity of inputs, it is impossible to increase the product without increasing the quantity of inputs. A production system is efficient from an allocation point of view if it chooses the optimal proportions with respect to their relative price in order to minimize the cost of production (Amara and Romain, 2000). Economic efficiency is the product of the two previous types of efficiency (Coelli et al., 1998). Emphasis will be placed on this latter type of efficiency. It will be examined whether a canteen meal and a ton of paddy rice produced by the beneficiary farmers have been obtained at the lowest cost. It will also be monitored to ensure that deadlines have been met, including timely delivery of food to canteens, agricultural inputs and equipment to beneficiary producers, or the payment of the latter after the sale of their production to WFP. Finally, it will be important to examine if the project has been able to apply the lessons learned from the first phase, which would reduce errors and ensure good results.

### **Efficiency of the school canteens of the project**

57. **The average cost of a meal is an indicator to compare the school meals of PAA Africa Senegal with those in other school feeding programmes.** This cost corresponds to the ratio between the average annual cost of a school canteen and the average number of meals distributed. The total cost is the sum of the following expenditure categories: food, logistics, storage, programme management and administration, personnel, equipment, and the community's contribution to meals. The number of meals served during the school year is equal to the average number of beneficiaries multiplied by the average number of effective days of operation of the canteen. The average cost of a meal is also calculated in four other models of school canteens in Senegal, namely: the Programme for the Sustainable Food System and Fight against Malnutrition (SADMAD), which is implemented by the Group of Research and Sustainable Development (GRDD); food and voucher projects, which are typical of WFP's school feeding programmes; "Milk in School", which is a school canteen project of the city of Dakar. All other things being equal, if the cost of a meal provided by PAA Africa Senegal's school meals is lower than that of the other programmes, then PAA's intervention model is more efficient. From the various information provided by WFP's office in Dakar, it appears that the total annual cost of PAA canteens is estimated at USD 746,517. Approximately, 3,264,000 meals were distributed during the 2015–2016 school year to 24,000 beneficiaries. The unit cost was USD 0.23 per meal. The average cost of a canteen is estimated to be USD 1,310.
58. The cost of a PAA meal and that of school canteen were compared to other similar programmes. The number of working days of the canteen was only available for certain programmes. Results show that the cost of a PAA meal is relatively low compared to other programmes (Graph 4). It is much cheaper than the Milk in School project and slightly higher than the meal price of other projects. On the other hand, the cost of a PAA school canteen is significantly lower than that of other projects; however, PAA's contribution only consists of rice.

**Graph 4: Comparison of meal costs of school canteen programmes**



Note: the Programme for the Sustainable Food System and Fight against Malnutrition (SADMAD), which is implemented by the Group of Research and Sustainable Development (GRDD); food and voucher projects are typical of WFP's school feeding programmes; "Milk in Schools", which is a school canteen project of the city of Dakar.

59. **The comparison of the cost of one meal in different programmes is not sufficient to identify the most efficient programme.** Indeed, the product of the school food canteen, in other words, the meal, varies from one programme to another. The nutrient content of a diet is not the same in all programmes. For example, the Milk to School project consists of the distribution of 20 cl of milk to each student per day, while PAA Africa Senegal distributes rice to beneficiary schools, and the SADMAD programme of the CRGG provides peas and lentils. On the other hand, the content of WFP's "food vouchers programme" consists of cereals, pulses, oil fortified with vitamin A, fish (canned food), iodized salt, enriched flour, fresh vegetables and condiments. The comparison between the costs of meals per unit and the one of different school feeding programmes does not take into account the nutrients and calorific intake of the meals distributed. Nutritional quality of meals is necessary to analyse the efficiency of the programme.
60. **Comparison between the effects of PAA Senegal canteens on educational performance and the effect of state canteens on educational performance of beneficiary schools.** Another approach that can be followed to analyse the efficiency of PAA Africa Senegal canteens would be to compare their impact on some indicators of educational performance with those of another school feeding programme implemented in Senegal. The programme of canteens of the state programme of Senegal in rural areas of the region of Kédougou was used for the comparison.
61. **Comparison between PAA Africa Senegal canteens and state canteens.** In terms of food for schools, PAA Senegal's involvement should lead to better results than the Government of Senegal's food for schools programme. First, the project's food ration was to include rice, lentils, salt and oil; however, the resources allocated to the school canteen by the Inspectorate for Education and Training (IEF) did not allow it to offer students an equivalent ration in terms of quantity and quality compared to that offered by PAA Africa Senegal. The reform introduced in 2015 consisted of transferring the sum of 3,700 CFA francs to the bank account of each school's management committee each year, of which 16.4 percent was allocated to the school canteen. Certainly, this change in the canteen funding method resulted in the effective availability of resources, but did not result in more food being acquired by schools. On the other hand, PAA Senegal should focus on the self-organization of communities around the school

by selecting schools where there is already a functional parents' association, setting up a canteen management committee, and providing capacity development through training and regular monitoring of its activities.

**62. Despite that the cost of one meal in the PAA Africa Senegal canteens is significantly higher than the one of the state canteens, there are no significant differences between the educational impacts of the two school feeding programmes.** State support to canteens did not involve close monitoring of the management of school canteens by the IEF; in addition, some difficulties were encountered in ensuring that regular visits were made to beneficiary schools due to road conditions. The application of the matching method of propensity scores (see Table 12) was used to directly compare the effects of the educational project with those of public schools having school canteens supported by the Government of Senegal. No significant differences were observed between the two types of schools, neither with respect to enrolment nor to repetition or drop-outs (Table 12). One explanation for this lack of difference in school performance is likely to be that PAA Senegal could not make its planned ration available to its schools. In many schools, PAA Senegal ended up providing rice, and the management committee was obliged to request resources from the community to provide food to students. Thus, the condition of project canteens resembled those of the beneficiary schools of the state's school feeding programme. The financial difficulties faced by WFP negatively impacted the project by reducing half of the beneficiary schools and eliminating lentils and oil from the food ration. The project's financial crisis thus explains why it was not possible to note any difference between PAA canteens and those of the state. The project officially started in 2012, but from 2014 the number of beneficiary schools was reduced due to a lack of resources; this indicates that inadequate funding was allocated to PAA Senegal since its launch. It was increasingly difficult to obtain resources from the international community. There should have been a recommendation not to start the programme unless WFP had financing for the duration of the project. Another solution would have been to only take on a number of schools corresponding to the amount of financing available.

**Table 12: PAA programme impact on scholastic performance with the propensity score matching approach (schools with a state-funded canteen constitute the control group)**

	WFP canteen	State canteen	Impact	Standard deviation	T-stat
Discontinuation rate	0.124	0.105	0.019	0.029	0.640
Drop-out rate of boys	0.114	0.114	- 0.000	0.027	- 0.100
Drop-out rate of girls	0.112	0.097	0.015	0.033	0.460
Rate of successful completion of the school year	0.860	0.895	- 0.035	0.033	- 1.070
Rate of successful completion of the school year for boys	0.831	0.886	- 0.055	0.036	- 1.520
Rate of successful completion of the school year for girls	0.825	0.903	- 0.079	0.050	- 1.570
Enrolment rates	0.991	1.000	- 0.009	0.009	- 1.000
Rate of enrolment for boys	0.999	1.000	- 0.001	0.001	- 1.000
Rate of enrolment for girls	0.984	1.000	- 0.016	0.016	- 1.000
Rate of successful completion of CFEE	0.824	0.825	- 0.001	-	-
Rate of successful completion of CFEE for boys	0.667	0.791	- 0.125	-	-
Rate of successful completion of CFEE for girls	0.857	0.875	- 0.018	-	-

*Note:* CFEE = certificate of completion of elementary education.

### **Efficiency of rice farmers benefiting from the project**

**63. Delays in payments to producers.** Even though producers confirmed in most interviews that PAA Senegal had a positive impact on their production and the amount of cropped land, they also acknowledged that they faced some difficulties while implementing the project. The first problem that was raised concerned the payment mechanism for produce purchased by the WFP. Indeed, following the harvest in the months of October and November, producers were generally required to sell their surplus produce and break even. The income they earned allowed them to meet their needs, including coverage of education expenses for their children. The complaint made to PAA Africa Senegal was thus that payments were late. During the first two years of the project, producers claimed they had to

wait three to five months to receive their money. Union presidents, GIE presidents and producers have all acknowledged that the delay in payment of the purchased products caused frustrations and misunderstandings with WFP at the beginning of the project. This payment delay, noted in all three PAA Senegal beneficiary districts, according to WFP experts, is due to the fact that tests are performed on samples of rice to determine its quality and approve its consumption by students. Administrative red tape within WFP lengthened the process, leading to the availability of resources in the bank accounts of farmer unions. This has raised doubts among producers. When the rice is purchased later, the producers face four types of problems: first, producers tend not to harvest early and are exposed to damage by animals since the fields are not fenced; second, although producers harvest in normal times, they are selling their products on the local market to meet their needs; next, producers do not have the appropriate infrastructure to store their products and wait for buyers; finally, if the rice is bought late, producers often do not have enough human resources to harvest because children begin school in October. To address the issue of payment delays, WFP has seized the opportunity offered by SODEFITEX, a public corporation for rural development located in the eastern and southern regions of the country, to purchase rice directly from producers. This greatly reduced the period between purchase and payment. A positive aspect of the project that was highlighted is the absence of entry barriers for producers wishing to benefit from the project.

64. **Compliance with hygiene and food safety.** During group interviews with teachers, mothers and students, issues relating to hygiene and the infrastructure of school canteens have been addressed. To teachers, the presence of canteens in schools is a way for students to practice lessons learned in the classrooms. Indeed, in the curriculum there are lessons on ethics that discuss hygienic practices. And canteens again become a classroom for teachers to provide practical lessons on hygiene and living together. At meal time, teachers monitor and guide students to wash their hands before and after eating. In this task, they are often aided by mothers who ensure that hands are washed with soap. Mothers from the Boundoucondi school report: "We give them water, soap and bleach to wash their hands before eating and after the meal." Moreover, due to their involvement in the management of the canteen, teachers assist in the kitchen to check if women meet cleanliness standards for food preparation. Despite the efforts of teachers and mothers to meet hygienic conditions in food preparation, some problems still exist in communities. First, there is the issue relating to the availability of drinkable water in the visited areas. In Dimboli, for example, water is manually pumped from wells; in the event of pump failure, people fall back on pond water. The unavailability of drinkable water explains the teachers' insistence on students using bleach. Another issue is that most schools do not have a proper storage warehouse to store food and cooking utensils. They are usually stored in the classrooms that are used for lessons and as offices. In other schools, such as Habibou and Banfaroto, supplies and equipment are kept in boxes. On the

premises, the evaluation team found that the food was stored on pallets at the back of classrooms and covered with dust, which students swept up every morning. Another problem often pointed out by mothers preparing meals is the lack of materials, including bowls. This lack of bowls means that students eat in turn and the bowls are not cleaned. These difficulties show that, in addition to diet, focus should also be placed on the availability of drinkable water, the small amount of equipment used to prepare or serve food, and a secure storage infrastructure for food and equipment. Bleach should also be part of the minimum package of products to be supplied to schools. “We must increase the amount of utensils because there are a lot [of students]. The utensils are used, we have no *couscoussiers* or dishes, etc.” (Table A3.2, Schedule 3).

### Key findings

- The cost of meals at PAA Africa Senegal canteens is higher than that of the state canteens. PAA Africa Senegal school canteens do not have better school performance than those of the state school canteens. Delays in payments to producers constitute an issue.
- Attention is paid to hygiene and food safety compliance for students.
- Taking into account the lessons learned from the first phase and implementing them in the second phase (market access was provided by SODEFITEX), local stakeholders were involved.
- The second phase was marked by the gradual withdrawal of the PAA in the education field. From 187 PAA beneficiary schools, the number shrank to 90 for the 2014–2015 school year.

## 2.4 Evaluation criteria 4: Impact

**65. Areas for impact assessment.** Project impacts will be examined in the areas of education and agriculture. For education, the focus will be on the performance of beneficiary schools in terms of enrolment, school drop-outs and successful completion of the final primary schooling exam. The effects of canteens on the students’ behaviour in terms of hygiene and eating habits will be examined.

**66. Group of PAA Africa Senegal school canteens’ beneficiaries and control group.** The Ministry of National Education database (StatEduc) provides detailed statistics on every public primary school over a long period. From this standpoint, data relating to rural public primary schools in the Kédougou region were extracted for the 2011–2015 period. Table 13 shows the distribution from the sample of PAA programme beneficiary schools and non-beneficiary schools used to evaluate impacts on school performance. A total of 180 schools in two groups were selected to conduct the evaluation. A first group consists of 86 schools having canteens funded by PAA over the 2011–2015 period and a second group of 94 non-beneficiary schools that received no support from PAA. The latter is divided into two sub-groups: a group of 38 schools that have never had canteens in 2011 and 2015 and another sub-group of 56 beneficiary

schools with canteens financed either by the Government of Senegal or by other donors in 2011 and 2015.

**Table 13: Sample distribution of beneficiary schools and non-beneficiary schools of the PAA programme over the period 2011–2015**

	2011	2015
Schools with PAA canteens	86	86
Schools without PAA canteens		
- <i>Without canteens</i>	38	41
- <i>With state canteens or canteens from other donors</i>	56	53
Total	180	180

Source: Specific calculations from the DPRE/MEN database.

**67. A model of non-experimental evaluation of the educational impacts of PAA Africa Senegal canteens.** The approach used to evaluate the impact of the PAA programme on school performance is not an experimental evaluation.<sup>15</sup> Its rigorous application required the observation of PAA programme beneficiary schools and non-beneficiary schools' characteristics before and after the project. Thus, we proceeded to verify these features using the simple mean comparison test. Table 14 summarizes the descriptive statistics on PAA-assisted and non-assisted schools before the intervention of the programme. School performance is generally explained by a number of factors that are unique to the school and its environment. The characteristics that we consider are physical infrastructure (classrooms in temporary shelters, latrines), teaching staff (academic degrees and teaching professionals), the educational organization (full course of primary schooling or not, number of students for each class, number of students per teacher), and school governance (management committee, parents' association, school project). The choice of these variables is dictated by their availability in the database and their relevance in explaining the school results.

**68. Significant differences between the group of PAA schools and the group of non-PAA schools.** Results in the table show that the status of physical infrastructure was worse in schools without PAA canteens. On average, temporary classrooms shelters (70 percent) and schools with an incomplete cycle (95 percent) are the most important characteristics. Similarly, school governance is less developed in these schools: 52 percent of non-PAA schools have a management committee and 87 percent have a parents' association, as opposed to 88 percent and 98 percent, respectively, in PAA school canteens. Overall, there is a significant difference between average observable characteristics of schools with PAA canteens and other schools, with the exception of three variables: the

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<sup>15</sup> See the methodology section for more details.

ratio of staff to students, the number of students per teacher group and academic degrees of teachers and school performance.

- 69. Using the propensity score matching technique to correct the initial differences between the beneficiary group and the non-beneficiary group.** Before the establishment of PAA Africa in Senegal, it is clear that beneficiary and non-beneficiary schools did not have the same characteristics. This is what justifies the use of a propensity score matching technique to correct these differences. For each PAA Africa Senegal beneficiary school, we looked for a sister school among the non-beneficiary schools. In this way, after matching, the two groups of schools will be as similar as possible with respect to their condition before the start of the PAA programme, allowing us to compare the average of their performance indicators. Furthermore, the availability of data relating to both beneficiary and non-beneficiary schools of the programme before and after implementation allows us to use a double difference method to estimate the impact of the canteen on school performance. The use of this technique is well suited to correct any bias caused by observable and unobservable characteristics of schools. The methodology and results of the match as well as the impact of estimation method are set out in Annex 11 of the report. The following paragraphs are devoted to analysing the results of the double difference.

**Table 14: Descriptive statistics of selected variables relating to beneficiary and non-beneficiary PAA schools, baseline 2011**

Variables	Schools without PAA canteens		Schools with PAA canteens		Average difference
	Moderate	Standard error	Moderate	Standard error	(Student's t)
<i>Attributes of the school</i>					
Cycle type (incomplete = 1)	0.95	0.023	0.67	0.050	0.272 (0.000)***
Unit type (provisional shelters = 1)	0.70	0.047	0.26	0.047	0.446 (0.000)***
Teacher's academic degree (Baccalaureate = 1)	0.36	0.050	0.37	0.054	-0.013 (0.859)
Teacher's professional diploma (CAP = 1)	0.58	0.051	0.78	0.046	-0.205 (0.004)***
Teacher ratios (student-teacher ratio)	31.31	1.353	31.34	1.055	-0.033 (0.984)
Number of students for each class	24.52	0.922	26.26	0.946	-1.741 (0.189)
Existence of school management committee (yes = 1)	0.52	0.051	0.88	0.034	-0.366 (0.000)***
Existence of parents' association (yes = 1)	0.87	0.034	0.98	0.016	-0.105 (0.009) ***
Existence of a school project (yes = 1)	0.94	0.025	0.99	0.011	-0.052 (0.070)*
Presence of latrines (yes = 1)	0.17	0.039	0.71	0.049	-0.533 (0.000)***
<i>School performance</i>					
Enrolment rate (proxy: % of new entrants to the CI)	100	0.00	99.80	0.198	0.198 (0.205)
Repetition rate (%)	2.74	0.322	3.01	0.955	-0.274

					(0.775)
Discontinuation rate (%)	11.93	0.808	12.59	0.819	-0.659 (0.567)
Rate of successful completion of CFEE (%)	95.98	1.691	84.67	5.706	11.31 (0.216)

Source: Specific calculations from the DPRE/MEN database.

Notes: CI = introductory course; CAP = teaching certificate; CFEE = certificate of completion of elementary education.

**70. Quality matches test.** Validation tests of the quality of the matches of the two models are presented in Table 15. According to this table, the pseudo R<sup>2</sup> of the two pairings decreased significantly, falling to a value between 0.012 and 0.3 after the matches exceeded a value of 0.39, according to the applied method of pairing. Moreover, the significance of the variables test is rejected (p value greater than 5 percent). Overall, the Propensity Score Matching (PSM) has reduced the average difference between the observed two groups by over 80 percent. Ultimately, although the B Rubin does not validate the test, other test results suggest that the match quality is satisfactory.

**Table 15: Quality criteria for matching propensity scores**

Control group with a canteen supported by other donors							
Matching type	Ps R <sup>2</sup>	Pseudo R <sup>2</sup>	P > Chi <sup>2</sup>	P > Chi <sup>2</sup>	Total percentage of bias reduction	B	R
	Before matching	After matching	Before matching	After matching		After matching	After matching
Kernel (Gaussian)	0.39	0.012	0.000	0.978	87	26.1*	1.86
Neighbour	0.39	0.03	0.000	0.754	85	40.7*	1.76
Radius	0.39	0.027	0.000	0.803	84	38.7*	1.46
Control group without canteen							
Matching type	Ps R <sup>2</sup>	Pseudo R <sup>2</sup>	P>Chi <sup>2</sup>	P>Chi <sup>2</sup>	Total percentage of bias reduction	B	R
	Before matching	After matching	Before matching	After matching		After matching	After matching
Kernel (Gaussian)	0.241	0.03	0.001	0.708	82	38.8*	2.10*
Neighbour	0.241	0.02	0.001	0.784	85	36.2*	2.48*
Radius	0.241	0.05	0.001	0.327	73	50.7*	1.30

Source: Calculations based on DPRE/MEN data.

**71. Estimation results.** Tables 16 and 17 set out the results of the double difference estimates of the impact of PAA on enrolments, drop-outs and the successful

completion of CFEE in PAA beneficiary schools having canteens and in non-beneficiary schools. Results are presented according to gender and the inclusion or not of the control variables in the model.

72. **Enrolment.** The results of Table 16 show that enrolment in the introductory course (CI) rose in PAA beneficiary schools having canteens. The provision of school meals had a positive impact on the enrolment of new students into the CI. However, the effect is not significant and does not exceed the 10 percent threshold. The non-significance disappears when the control variables are taken into account in the model (Table 17). The programme has witnessed a 0.3 percent increase of enrolments into the CI. The gender analysis shows that the programme tends to increase enrolment among both boys (1.1 percent) and girls (0.6 percent), with a more pronounced effect on boys (Table 17).
73. **School drop-outs.** The question that arises is whether the PAA programme has reduced the drop-out rate in schools where the project is operating. To verify this, we applied the double difference to the data collected at the beneficiary schools and non-beneficiary schools before and after implementation of the PAA programme. The estimation results without controls show that overall the programme had a positive but not significant effect on school drop-outs (Table 16). The non-significance of the overall impact persists even with the inclusion of control variables. The same trend is observed in boys. Conversely, despite the implementation of the PAA programme, the drop-out rate of girls continued to increase by 2 percent between 2011 and 2015 in beneficiary schools. These results do not meet our expectations, but they can be explained by several extracurricular factors. Yet, the lack of data collected from student households does not allow us to rule on the factors that mostly influence girls from discontinuing their schooling.
74. **Certificate of completion of elementary education (CFEE).** One of the goals of PAA canteens is to significantly contribute to the improvement in the quality of education in beneficiary schools, in particular by increasing the success rate of the certificate of completion of elementary education (CFEE), which is the first official degree in Senegal obtained at the end of primary school. The examination is organized nationally by the Ministry of National Education. For any given school, the rate of successful completion of the CFEE is the ratio between the number of reported students admitted and the number of students who undertook the exam. The estimated results of the double difference without control variables reveal that the impact on the overall rate of admission to the CFEE is not significant, even though the coefficient remains positive (Table 16). However, the effect becomes significant with the introduction of control variables in the model (Table 17). Thus, the programme has led to an increase of 30 percent of the successful completion of the CFEE rate. Gender analysis indicates that the programme has no significant effect on the successful completion of the CFEE by girls and boys if taken separately. Ultimately, these results show that the impact of the PAA programme on school performance is mixed. Enrolment in the first grade of elementary and successful completion of the CFEE experienced a

significant improvement in schools benefiting from the programme. However, PAA canteens were not able to significantly reduce the number of school drop-outs.

## **75. Possible explanatory factors for the lack of educational effects of PAA**

**Africa Senegal canteens.** The results showed no significant impacts of the school feeding project on the academic performance of schools benefiting from PAA Africa Senegal canteens. The relatively high enrolment rates may explain that they have an insignificant marginal impact on enrolment. Disaggregation of the rate of enrolment has shown that enrolment in the first year of primary school is higher than average because of drop-outs throughout the cycle, which reduced the school's population. It is, therefore, difficult to significantly increase it as a result of a single factor. Another explanation for the results is the small sample size of beneficiary schools. PAA Senegal Africa has halved the number of beneficiary schools on which estimates were made. A larger sample would probably have detected positive effects on school performance. Finally, the fact that the food ration received by schools was reduced to the distribution of rice has strongly influenced school diets. Overall, with a non-experimental design and incomplete data, it is difficult to analyse the real impact of PAA; therefore, results should be cautiously interpreted.

**Table 16: Results of estimated double difference\* without control variables**

	Enrolment			Discontinuance			Completion of the CFEE		
	Overall	Girls	Boys	Overall	Girls	Boys	Overall	Girls	Boys
Year	-1.751 (-0.88)	-1.290 (-0.41)	-2.212 (-1.62)	-1.294 (-0.61)	-1.603 (-0.68)	-2.423 (-1.04)	-81.99*** (-3.87)	-68.32*** (-3.08)	-65.78*** (-2.70)
Beneficiary	-0.306 (-0.19)	-0.298 (-0.11)	-0.315 (-0.28)	0.961 (0.56)	1.849 (0.96)	-0.753 (-0.40)	-11.30 (-0.80)	0.295 (0.02)	6.487 (0.40)
X year beneficiary	0.904 (0.42)	-0.0680 (-0.02)	1.875 (1.26)	1.015 (0.42)	0.604 (0.23)	2.657 (1.02)	28.87 (1.28)	11.35 (0.48)	16.64 (0.64)
_Cons	100*** (65.67)	100*** (41.46)	100*** (95.30)	12.27*** (7.99)	10.48*** (6.11)	13.60*** (8.09)	95.33*** (7.34)	82.61*** (6.08)	78.28*** (5.25)
N	136	136	136	187	187	187	63	63	63
R2	0.014	0.009	0.031	0.012	0.020	0.007	0.510	0.495	0.388
F	0.613	0.397	1.402	0.670	1.262	0.456	20.49	19.27	12.46

Source: Our estimates from the DPRE/MEN database.

Note: Estimates are made considering the control groups of schools without canteens.

\*\*\* = statistically significant at the 1 percent level; \*\* = statistically significant at the 5 percent level; \* = statistically significant at the 10 percent level.

**Table 17: Results of estimated double difference\* with control variables**

	Discontinuance			Enrolment			Completion of the CFEE		
	Overall	Boys	Girls	Overall	Boys	Girls	Overall	Boys	Girls
Year	-0.570** (-2.38)	-0.396 (-1.21)	-0.80*** (-3.23)	-13.52*** (-6.04)	-17.50*** (-19.52)	-11.58*** (-3.89)	-5.440*** (-4.77)	-4.084*** (-2.68)	-3.81*** (-2.86)
Beneficiary	0.124 (0.90)	0.210 (1.02)	-0.0675 (-0.46)	-12.19 *** (-11.70)	-14.26 *** (-18.80)	-11.98 *** (-9.91)	-1.143 (-1.11)	0.748 (0.55)	0.452 (0.44)
Impacts in %	<b>0.80</b>	<b>0.50</b>	<b>2</b>	<b>0.30</b>	<b>1.10</b>	<b>0.60</b>	<b>30</b>	<b>11</b>	<b>6</b>
X year beneficiary	0.251 (1.26)	0.185 (0.67)	0.432 ** (2.03)	13.15*** (9.04)	16.71 *** (11.79)	12.30*** (8.84)	2.540** (2.25)	1.129 (0.79)	0.581 (0.46)
Teacher-student ratio	0.0126 ** (2.08)	0.010 (1.31)	0.0135 * (1.95)	-0.135 (-1.26)	-0.08* (-1.70)	-0.208 (-1.51)	0.136** (2.49)	0.161** (2.42)	0.117** (2.19)
Number of students for each class	0.004 (0.38)	0.008 (0.65)	0.0036 (0.34)	0.018 (0.21)	-0.021 (-0.43)	0.059 (0.59)	-0.175* (-1.88)	-0.200* (-1.80)	-0.146 (-1.60)
Parity (ratio girls/boys)	0.0062 (0.05)	-0.065 (-0.33)	0.0786 (0.55)	-1.174 (-1.33)	-1.542 (-1.58)	-1.663 (-1.44)	0.661 (1.45)	0.216 (0.46)	0.690 (1.17)
Teacher's sex (male = 1)	0.0486 (0.26)	-0.049 (-0.21)	0.064 (0.37)	-0.247 (-0.17)	-0.647 (-0.62)	-0.642 (-0.36)	0.0948 (0.09)	0.174 (0.16)	0.166 (0.16)
Number of latrines for 50 students	-0.012	-0.003	-0.0123	-0.202	-0.226	-0.210	0.0753	0.139	0.059

	(-0.82)	(-0.17)	(-0.86)	(-1.55)	(-1.06)	(-1.59)	(0.91)	(1.48)	(0.70)
Cycle type (incomplete = 1)	0.208 (1.40)	0.239 (1.38)	0.157 (1.00)	2.274** (2.36)	3.895** (2.27)	2.408 (1.61)	-2.050** (-2.56)	-2.502*** (-2.61)	-1.702** (-1.97)
Existence of school plan (yes = 1)	-0.184 (-1.56)	-0.193 (-1.37)	-0.217* (-1.68)	1.184 (1.00)	-0.307 (-0.44)	2.268 (1.56)	0.187 (0.43)	-0.166 (-0.33)	0.696 (1.38)
Type of class group (single flow = 2)	0.253 (1.60)	0.0439 (0.23)	0.436** (2.52)	-15.59 *** (-18.20)	-16.71*** (-13.49)	-17.84 *** (-22.35)	0.731 (0.51)	1.507 (1.02)	0.628 (0.45)
Type of class group (multigrade = 2)	0.481*** (2.78)	0.203 (0.91)	0.649*** (3.45)	-17.94*** (-9.07)	-18.63 *** (-14.47)	-21.38 *** (-9.33)	1.054 (0.85)	1.716 (1.43)	1.032 (0.81)
Academic degree (diploma other than baccalaureate = 1)	0.0729 (0.84)	0.0772 (0.70)	0.108 (1.13)	0.0902 (0.14)	-0.324 (-0.35)	0.246 (0.42)	-0.009 (-0.02)	-0.165 (-0.31)	-0.146 (-0.29)
Professional diploma (CAP = 1)	-0.039 (-0.45)	0.042 (0.36)	-0.057 (-0.57)	-1.802 (-1.10)	-0.704 (-0.62)	-2.946 (-1.51)	0.314 (0.49)	0.406 (0.66)	-0.262 (-0.33)
Place type (normal place = 1)	0.020 (0.17)	-0.063 (-0.41)	0.116 (0.87)	-0.622 (-0.52)	1.190 (1.44)	-1.564 (-1.28)	-0.744 (-1.21)	-1.124* (-1.75)	-0.543 (-0.81)
Existence of parents' association (yes = 1)	0.193 (0.77)	0.735 (1.44)	-0.0385 (-0.11)	0.174 (0.10)	0.393 (0.23)	0.164 (0.06)			
_cons	-2.821*** (-6.45)	-3.322*** (-4.79)	-2.661*** (-5.03)	39.15 *** (17.63)	41.40 *** (13.90)	44.07 *** (18.67)	3.355** (2.57)	2.033 (1.17)	1.181 (0.82)

<i>N</i>	187	187	187	136	136	136	53	53	53
<i>AIC</i>	136.5	130.4	136.9	42.29	40.77	40.03	73.41	75.62	75.23
<i>BIC</i>	191.4	185.3	191.8	91.81	90.28	86.63	104.9	107.1	106.8

Source: Our estimates from the DPRE/MEN database.

Notes: \* = estimates are made by considering the control group of schools without a canteen. T-stats are put in brackets. CAP = teaching certificate.

- 76. Improvement of the PAA Africa Senegal beneficiaries' socio-economic situation and the socio-economic situation of the project beneficiaries.** The project strengthened the food security of producers not only by increasing their yields and agricultural production, but also by raising awareness about the importance of building up emergency reserves. Producers have clearly explained that now after harvest they divide their production into three parts: one part is destined for household consumption (as a food safety objective), another one is saved for the following year for seed, and the last part, the surplus, is sold. Furthermore, the additional income from their rice farming allowed them to increase their food expenses and their health and education expenses. More generally, women have improved their socio-economic situation and are now able to buy non-food items. "Our income improved and we can meet our needs and those of our children. Before we grew crops just to survive." The president of the Dimboli GIE added: "The GIE was created through the project and today the women can enrol their children, buy clothes and meet other family needs." In addition, some men surveyed claimed that women have improved their health and food security since the programme began. A Dimboli producer, during a discussion group, said: "There has been change. Women are no longer willing to prepare the same type of meal every day. For example, they do not cook corn for a whole week. Before we could eat the same food for a month. Now they demand that the dishes vary. The change now? We eat our fill; the cultivation of rice has caused many women to give up gold panning".
- 77. Relief from arduous manual labour.** It is expected that PAA Africa Senegal has changed attitudes towards gender, including giving more power to women and girls. We will examine to what extent the project succeeded. We are interested in any changes introduced by the project to the position of women rice producers and to girls attending PAA Africa Senegal schools with a canteen. As part of the project, FAO has provided women with agricultural inputs, agricultural equipment and training. Women are beginning to get organized and creating GIEs and, as men did, they have learned new farming techniques to improve their yields. The introduction of paddy rice threshers have relieved women from processing paddy rice into white rice by hand. The impact of the threshers was strongly emphasized by women during individual or group interviews. The threshers supplied in the three districts allowed women to be freed by the manual labour of threshing. According to the president of the Bandafassi union: "With machines [threshers], women are relieved as this duty insofar as they are not required to work with their hands. They earn time and health. The machines do the heavy work." However, some women producers benefiting from the project only have access to threshers to transform paddy rice for WFP. During a panel discussion at Dimboli, a producer said: "The thresher that WFP has brought only threshes the stock it purchased. We do not have access to have another machine". School canteens also free women from the obligation to return at home at noon to prepare food for children who have returned home from school. With the distribution of meals in canteens, women can work longer in the fields. Among

the producers of Dar Salam, a participant in the discussion group said: “Yes, women are no longer stressed because children eat well at school. Before, women were forced to leave the field to go prepare the meal before the child returns to school.”

78. **Reduction of women work time.** Besides alleviating the hardship of work, feedback from interviews, both from women and men, stressed the working time women saved by using the thresher and the tractors as well as the school meals provided by the project. They spend more time in their fields, dealing with other less painful but essential work to improve performance. The fact that the production of paddy rice by women is higher than men, while the opposite was observed when starting the project, shows that women could productively use their spare time saved thanks to agricultural equipment and the school canteen.

## **Changes in behaviour**

79. **Self-organization of producers.** The project has strengthened the organizational capacity of producers through a series of training sessions and field visits. We have seen the positive effects of these efforts on producer organizations. We observed that farmers have improved their ability to work together and be organized since the PAA project started. They recognized that before the intervention not many of them were organized into GIEs, but since the project began many GIEs were created. The president of the Dimboli producers’ union says: “At the beginning, we had five GIEs; today the union has 27 GIEs”. The presidents of beneficiary unions also agreed that the project helped them strengthen their capacity to negotiate, organize meetings and discuss issues. Like many GIEs or producers’ union leaders have claimed, thanks to the project, today roles have been clarified, while before all the responsibilities were managed by the president of the producers’ union. The DRDR of the Kédougou region has insisted that the Departmental Service of Rural Development (SDDR) is now rarely applied in the event of problems because producers are better organized in the framework of their GIEs and producers’ unions, and are able to manage their disagreements. Additionally, PAA has provided producers’ unions with threshers for converting paddy rice into white rice. This freed up women from exhausting manual labour since they were required to thresh or pound paddy rice for white rice to feed themselves or to sell on the local market.

80. **Changes in eating behaviours of students.** One necessary condition to attain the objectives of PAA school canteens was an improvement in the administration of the management committees’ financial resources and in their ability to negotiate with the different traders from whom they purchase food and with the local producers who supply grain. The implementation of school canteens has helped to vary children’s diets and change some of their habits. During the discussion group with mothers of the Banfaroto school (Dar Salam), they acknowledged that their children have become accustomed to eating at school, where rice is prepared with oil and where the food quality is better. Moreover, sometimes they even refused to eat at home, as they preferred food

prepared at school. A mother during the discussion group at Boundoucondi (Bandafassi) said: "If the rice is not oiled properly, children do not eat and you have to put enough condiments". Other mothers added: "When they eat rice and oil in the canteen, they refuse to eat the food we cook at home; they eat well in the canteen and suddenly they do not eat at home. If the dishes do not have vegetables, they refuse to eat" (Table A3.2, Schedule 3). Even if the ingredients used in households are different from those at the school, it is the mothers of children who prepare food at home and at school. Some teachers have emphasized the importance of teaching mothers new recipes (Table A3.2, Schedule 3).

**81. Empowering women.** Beyond the objective of increasing rice production and ensuring adequate food in schools, PAA Senegal also had the ambition of promoting women's economic activities and greater independence for women in districts where the project was taking place. From the interviews with men and women producers, women have moved forward with the PAA Senegal project. Indeed, women producers say they have increased the area of their crops and at the same time their rice production. For example, in Dar Salam, women say that "Today someone who grew 0.25 ha can now sow up to 0.75 to 1 ha." The increase in area and input availability have significantly increased rice production. This allowed women to sell a larger surplus, whereas before the project what they produced was simply used for their own consumption (unlike men who were able to sell a large portion of their rice harvest in the market). Profits from the sale of their surplus gave women the opportunity to invest in their children, to buy livestock for livestock development, and to better meet their own needs including clothing purchases or the purchase of movable properties (beds, wardrobes, etc.).

**82. Unintended consequences of the canteens.** With school canteens, teachers and school directors have gained new responsibilities. As explained earlier, each school has a teacher to manage the canteen to ensure that mothers prepare food in compliance with hygiene standards and use the right ingredients. Teachers monitor children's hygiene before and after eating, and they are normally required to wait about one more hour after school until children have finished eating. According to a teacher from the Ibel School (Bandafassi): "It does not affect our work as a teacher. I run the canteen and make all the measurements of food quantities for preparation and I monitor when children eat, but it does not affect our work in class. I do not let the women work alone. I monitor hygiene. If I see that hygiene rules are not followed, I ask them to consider the hygiene of the food."

### Key findings

Project impacts will be examined in the areas of education and agriculture. For education, the focus will be on the performance of beneficiary schools in terms of enrolment, school drop-outs and successful completion of the final primary school exam.

- The results in the table show that the status of physical infrastructure was worse in schools without PAA canteens.
- **Enrolment.** The results of Table 16 show that enrolment in the introductory course (CI) rose in PAA beneficiary schools having canteens. However, the effect is not significant and does not exceed the 10 percent threshold. The gender analysis shows that the programme tends to increase enrolment among both boys (1.1 percent) and girls (0.6 percent), with a more pronounced effect on boys (Table 12).
- **School drop-outs.** The drop-out rate of girls continued to increase by 2 percent between 2011 and 2015 in the beneficiary project schools compared to non-beneficiary schools.
- **Successful completion of the CFEE.** The programme has favoured an increase of 30 percent passing the certificate.
- **Improving the socio-economic situation of PAA Africa Senegal beneficiaries and the socio-economic situation of project beneficiaries.** “We eat our fill; rice cultivation has ensured that many women have given up gold panning” (Table A3.2, Schedule 3).
- **Relief from arduous manual labour. Changes in behaviour.**
- **Self-organization of producers.** “The president of the Dimboli producers’ union says: “At the beginning, there were five GIEs; today the union has 27 GIEs.”
- **Changes in students’ eating habits.** Even if the ingredients used in households are different from those at the school, it is the mothers of children who prepare food at home and at school. Some teachers have emphasized the importance of teaching mothers new recipes.
- **Empowering women.** Investment in welfare (bed, wardrobe, etc.).
- **Unintended consequences of canteens** resulted in an increase of 0.3 percent of enrolments into the CI. The gender analysis shows that the programme tends to increase enrolment among both boys (1.1 percent) and girls (0.6 percent), with a more pronounced effect on boys (Table 12).

## **2.5 Evaluation criteria 5: Sustainability**

83. **Sustainability.** Through the sustainability criterion, the evaluation team is investigating whether PAA Africa Senegal, well after the withdrawal of WFP, will continue to function normally with respect to its production and marketing of rice components or with the regular provision of rice to schools. On the one hand, sustainability issues examine the ability of producers to continue to obtain good yields and market their grain surplus after the withdrawal of PAA Senegal; on the other hand, they examine the ability of the government to provide the beneficiary schools with resources to ensure the smooth running of their school canteens.

**84. Sustainability effects of capacity development for organizations.**

When the PAA Senegal organized producers into GIEs, and then unions, it was to ensure that on the one hand they enjoyed the benefits of the project (training, inputs and materials), and that on the other hand they were provided with bargaining power to increase profits from their production in the market. Technology transfers and new knowledge through organizational management capacity and cultural practices reinforcements gave producers more responsibility in the management of their farming activities and greater self-esteem. Thus, after each harvest, producers have been able to negotiate a better price than that offered by WFP to sell their agricultural surpluses. Producers' unions now negotiate directly with SODEFITEX to fix the price of paddy rice and the conditions of sale, including the collection of the purchased quantities. The unions continue to defend the interests of their members.

**85. Sustainability of increased planted area.** We must also add that the sustainability of the increase in rice areas and yields is possible due to synergies with other local stakeholders developed by PAA Senegal during the performance of the project. Indeed, PAA responded to lessons learned from the first phase of the project by closely involving state departments such as the PAPIL, PADAER and DRDR. Each of these entities has played a specific role, particularly with respect to strengthening producers' capacities, supplying inputs and equipment, and technically monitoring crops. With respect to the marketing aspect, PAA Senegal relied on SODEFITEX to purchase paddy rice, and relied on PADAER for the marketing of seed production.

**86. Of the viability of freely providing agricultural inputs.** Despite all these efforts, we must recognize that the sustainability of the agricultural component is facing two challenges. The first and most important one is undoubtedly the free supply system established by PAA in Senegal. Many local stakeholders interviewed felt that the producers will not continue to receive free quality seeds, fertilizer and agricultural equipment. The latter approach is in line with the agricultural input subsidy policy in Senegal, as described in the IPAR 2015 report: the government annually extends subsidies and widens the list of beneficiary crops. In addition, it also tries to apply the principle of digressive access to inputs.<sup>16</sup> A gratuity must be substituted with an access policy that gradually transfers the payment of operating expenses related to seeds and agricultural equipment to producers. The second challenge is the management of project costs of other partners supported by PAA Senegal. The question arises as to who will take over the project for the completion of these actions. Kédougou is considered to be one of the poorest regions of the country, so agricultural projects will certainly multiply. New projects will provide technical support to producers.

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<sup>16</sup> With the exception of rice and groundnut for years, input subsidies are unchanged for the years 2013/14 and 2014/2015 (IPAR, 2015).

**87. Of the sustainability of PAA Africa Senegal's canteens.** With respect to school canteens, it is questionable whether they will continue to function normally after the withdrawal of the project. The number of schools benefiting from canteens dropped from 180 to 90 in two academic years, and by the end of November 2016, no school was running its canteen. The continuity of operating school canteens is a battle that is far from being won. Moreover, schools benefiting from PAA Senegal have not learned how to source directly from local producers to the extent that dealings between the two categories of beneficiaries have not been tested by the project. However, buying local products to feed the students is PAA Africa's pioneering idea. How can the concept become functional if the project ends before the concept is tested? The sustainability of school canteens set up under the programme may also be examined from the point of view of financing. During the focus groups, producers have indicated that it is difficult or impossible for communities to provide rice freely to schools, as surplus production is marketed to address spending on education, health and other household needs. While communities will continue to support canteens, their contribution will not be sufficient to ensure the normal operation of school canteens. One must wonder whether the government will replace the PAA Africa Senegal in funding schools by providing schools with adequate financial resources. Such a condition will probably be fulfilled.

**88. Government of Senegal support to PAA Africa Senegal canteens after the end of the project.** To support the implementation of food in schools, the Government of Senegal has introduced reforms aimed at school establishments which allow schools to allocate 16.4 percent of their allocation to purchasing food. This initiative allows schools to operate canteens, but the budget is still low compared to the number of schools and students being cared for. The government is aware of the importance of providing food for schools in rural primary schools, as it allows for the retention of students in their schools, it increases teaching time and it improves the nutritional status of schoolchildren. Experimental evaluations conducted by the CRES in 2012–2013 with support from the Ministry of National Education of Senegal and WFP's office in Senegal showed the many benefits from good nutrition on school performance. Within the context of extreme poverty and lack of schooling, which characterizes the Kédougou region, the school canteen is a powerful tool to attract and retain those schoolchildren who are increasingly appealed by the prospects of quickly earning money by panning for gold and thus giving up on school. However, the Government of Senegal has several policy levers to ensure adequate financial means for school canteens in rural Kédougou. First, as a part of its social protection policy for the poor, a portion of the resources should be allocated to the school canteen programme, which is considered to be a social safety net. Next, the one billion francs annual budget allocated by the Ministry of National Education to the school canteen programme should be substantially increased so as to better cover the basic needs of canteens. Given the significant increase in public resources recorded in recent years and the good prospects for economic growth posted by

the country, freeing up an additional several billion francs for food in schools is sustainable. The development of an autonomous nutrition programme for schools, planned by the Ministry of National Education in 2017, should offer official goals for coverage, types of rations, annual budgets, and the programme funding contribution expected from all national partners, including the central state. This programme must also demonstrate the fiscal sustainability of the state's projected contribution and submit strong advocacy material to the Minister of Economy and Finance, the parliament and local councils in order to sway public opinion and make school feeding one of the prioritized policies of the national strategy for combating poverty, malnutrition and school drop-outs.

### **Key findings**

For sustainability, the analysis places the focus on production and education.

For production, the involvement of local players ensures the sustainability of the project through:

- strengthening the capacity of producers' organizations;
- abandoning the policy for the free supply of agricultural inputs; and
- increased support from the Government of Senegal to school canteens.

### **3. Lessons learned**

#### **89. What did you do with lessons learned from the first phase of the PAA Africa Senegal project?**

In the first phase of the project, many problems emerged, highlighted both by partners and beneficiaries. A first challenge was related to the lack of threshers. Indeed, during the pilot phase nine threshers and harvesters were purchased to help in the treatment of rice and relieve women's work. However, due to technical issues, such equipment did not last long. In response to this, PAA Senegal signed a contract with a private service provider (Yellitaré) to carry out the threshing. The project has also bought three powerful threshers, and the same provider was asked to train members of farmer unions on the use of the machinery. Second, PAA hired GADEC to monitor PAA operations in the implementation areas; that is, receiving the inputs, providing distribution, ensuring compliance with the agricultural technologies, and making progress reports and end-of-season reports. However, at the beginning of phase II of PAA Africa, GADEC did not comply with its commitments, and the PAA relied primarily on the technical services of the state, namely the DRDR. This helped to facilitate the withdrawal of PAA and leave the implementation to the state. Third, during the pilot phase of the project, payment of rice producers was significantly delayed. To address this problem, WFP adopted a two-pronged approach. On the one side, WFP revised its procurement procedures, while on the

other it established linkages between producers and SODEFITEX, to whom they were able to sell their rice. Fourth, coordination issues emerged at the start of the project, both between the agencies and between PAA, technical departments and local authorities. This issue was tackled in phase II; for example, by increasingly involving local authorities in the implementation of the project to take the lead in situations of conflict or to make logistical measures available.

**90. What are the lessons for the extension phase?** Several lessons can be drawn from the second phase for the benefit of the extension phase:

- (i) PAA Senegal Africa faced marketing difficulties, and producers have been accustomed to a free supply system that makes it difficult to acquire agricultural inputs at market prices. By setting up a system of contracts with suppliers of inputs and production customers early in the extension phase, PAA Africa Senegal will lay the foundation for sustaining its support to small producers. Even if a subsidy is awarded to small producers, it should be digressive so as to ensure a regular supply to providers with whom strong relationships have already been forged during the implementation of the project.
- (ii) Access to credit for purchasing agricultural inputs has been absent from the PAA Africa Senegal project. The low level of training of small producers and their difficulties to access funding sources should be better reflected in the extension phase, which should provide for building capacity among producers and their organizations while also linking them to the decentralized financial systems. On the other hand, PAA is an innovative programme where the inputs are distributed to the most vulnerable populations. PAA differs from the government's input subsidy policy, as the latter spreads an uneven distribution of inputs, and benefits large-scale farmers disproportionately (IPAR, 2015). PAA has developed a new concept of input distribution for the most disadvantaged farmers.
- (iii) Local actors have played a decisive role in the implementation of phase II of the project. Their involvement should be a key principle in the design and implementation of PAA Africa's next phase. If many mentoring activities are assigned to them, FAO and WFP could concentrate more on monitoring and strategic direction.
- (iv) The selection of favourable areas for agricultural development is crucial to the success of the PAA Africa Senegal project. Given the results of previous phases of PAA, the Government of Senegal and its partners (WFP and FAO), together with the secretariat of PAA/Headquarters, agreed to continue the project in the Kédougou region and to lay the foundations for an extension phase to other rice-producing areas of the country. Some of the regions include Saint-Louis and Matam in the River Valley and Ziguinchor, Sédiou and Kolda in Casamance Naturelle for their high capacity of agricultural production, especially in rice. The PAA extension project is harmoniously integrated with the Accelerated Programme for Agriculture in Senegal (PRACAS), in virtue of four aspects: (i) the targeting strategy, which focuses on vulnerable households; (ii) its resilience-based approach to improving livelihoods; (iii) the focus on facilitating market access for smallholders as a means to increasing incomes; and (iv) the attention paid to food and nutrition

- in rural areas through the diversification of agricultural production and school canteens.<sup>17</sup>
- (v) The second phase was marked by the gradual withdrawal of PAA in the education field. The number of beneficiary schools decreased from 187 to 90 for the 2014–2015 school year. FAO and WFP must ensure that any project included in the extension phase will be adequately funded. The early termination of PAA Africa Senegal's support to schools would be resented by the beneficiaries.
  - (vi) In collaboration with the decentralized services of the Ministry of Agriculture and the Ministry of National Education, FAO and WFP are responsible for the implementation of the project. As such, they conducted joint assignments with the government's focal points. The Brazilian Government also conducted a supervisory mission, visited the project, and thrice met with stakeholders at the field level. A study of the baseline at the beginning of the project was conducted jointly.<sup>18</sup> According to the PAPIL report, there is a lack of coordination between WFP and FAO regarding the implementation of inputs and consequently monitoring the production and marketing. In order to find solutions to problems of coordination, the role of FAO and WFP has been transferred to local partners. Indeed, many partners in government and civil society were involved in the implementation and cross-sectoral approach that favoured a technical and political dialogue between ministries, non-governmental organizations (NGOs) and stakeholders.<sup>19</sup> One flaw of the partnership consisted in WFP's and FAO's inability to implement mechanisms that directly link the school canteens with the rice farmers supported by the project.

## **4. Key findings and recommendations**

### **4.1. Key findings**

**91. The school canteen: a powerful factor for schooling.** Within the context of extreme poverty and lack of schooling, which characterize the Kédougou region, the school canteen is a powerful tool to attract and retain schoolchildren who are increasingly appealed by the prospects of quickly earning money by panning for gold and thus giving up on school. From an educative, food security and schooling point of view, the region of Kédougou was certainly the most appropriate region in the country to welcome PAA Africa Senegal. Further evidence of the relevance of the project is the link between agriculture and education, by the means of school canteens serving as markets for rice produced by local smallholders. Finally, the alignment of PAA Africa Senegal with the national policy to develop school canteens and the role assigned to the Ministry of National Education and the Food Security Commissioner in the implementation of the project is further evidence of the project's relevance.

<sup>17</sup> Extension of the PAA to the valley of the Senegal River and Casamance: Strengthening the Means of Existence of Rural Households through Local Food Purchase Initiatives (Playdoier document).

<sup>18</sup> Concept note for a joint FAO-WFP-Government of Senegal pilot project extension phase.

<sup>19</sup> PAA Africa Senegal – Phase II Midterm Monitoring Draft Report (May 2016).

**92. PAA Africa Senegal has many achievements to its credit.** PAA Africa Senegal has accomplished many achievements. It strengthened the capacity of producers through a series of training sessions and carried out regular monitoring by conducting field visits. Producers were trained in the technical aspects of rice crop management, organizational dynamics and security reserve policies between 2013/2014 and 2015/2016. They also received agricultural pre-harvest and post-harvest equipment (seed kits, fertilizer and rice dehusking equipment). Several farmer unions were trained during the course of the project in the area. PAA Africa Senegal's involvement also increased agricultural capacity and significantly increased the developed cropping areas and the agricultural productivity of the beneficiary producers. The average yield was, in fact, estimated at 2.5 mt/ha in 2012/2013 and 3.2 mt/ha in 2015/2016 against 0.8 mt/ha in 2011/2012, a respective increase of 1.7 mt/ha. On average, the quantity of paddy rice produced by the beneficiary producers has almost doubled from 422 kg to 808 kg, with stronger growth among women producers. The increase in production has not lowered the price for producers of paddy rice. One of the major goals of the project in supporting producers' organizations was developing their negotiating capacity. The overall finding is that, despite free access to agricultural inputs and equipment, paddy rice prices paid to beneficiary producers are higher than those recorded in other regions of the country, as in the Senegal River Valley. The price offered by PAA was 145 CFA francs against 125 CFA francs in the Senegal River Valley, and 135 CFA francs in the local market. Negotiations between SODEFITEX and producers' unions in the Kédougou region were settled by means of an agreement on a producer price set at 135 CFA francs for the 2016/2017 cropping season. The incomes of beneficiary producers have grown rapidly as a result of increased production and better prices for the producer. This has allowed producers to increase their food expenses, but also the expenses for health and education. The food security of beneficiary producer households has improved greatly; producers have sold their grain surpluses after setting up security reserves. No data were recorded to assess the project's impacts on food consumption expenditure and non-food consumption expenditure which would have allowed for an assessment of the project's impact on the welfare of the producers' households.

**93. Contribution of the project to the mobilization of communities in favour of school canteens in the region.** With respect to education, the project initially provided benefits to 180 public primary schools in the departments of Bandafassi, Dar Salam and Dimboli. However, two years later, that number was halved due to financial difficulties faced by WFP. Equally concerning, the food ration was reduced to only white rice being distributed in the schools still benefiting from the programme. Communities were obliged to bring additional products to prepare an acceptable meal. A major outcome of the PAA Senegal Africa project was that it was able to mobilize communities by using canteen management committees. Overall, the involvement of communities focused on food preparation by women producer beneficiaries, in-kind contributions

(condiments, rice, corn, broth, etc.), and cash contributions (the contributions of students). Teachers were also highly involved in running the school canteens. In addition, the teachers who were interviewed have all stated that canteen activities were not so demanding as to prevent them from properly doing their class work.

**94. Improvement of nutritional status of students, enrolment in primary school and CFEE exams.** There are no quantitative data to evaluate the project's effect on the nutritional status of children and on the nutritional status of PAA beneficiary households. However, from different one-on-one and group interviews conducted by the evaluation team, it appears that the beneficiary students have experienced improved nutritional status and food security. Beneficiary students spend more time in school. However, results of the impact assessment for the PAA Africa Senegal project are mixed when it comes to school performance using the double difference. The distribution of meals at school has led to an increased number of enrolments in the introductory course (CI) in the schools benefiting from PAA canteens. There was also a significant improvement in the successful completion of the primary school-leaving certificate (CFEE) in schools benefiting from the project as opposed to schools that did not benefit from the project. Yet, PAA canteens were not able to significantly reduce the number of school drop-outs. The drop-out rate for girls continued to increase by 2 percent between 2011 and 2015 in beneficiary schools as opposed to non-beneficiary schools.

**95. The project has brought other benefits to producers.** The amount of time spent tilling the soil has decreased. Women benefited from this, to increase the amount of time devoted to other agricultural activities, and were able to improve their yields more than the men could. They used the time they saved for their well-being and that of their households.

**96. Sustainability of project interventions for rice farmers.** The sustainability criterion enabled an assessment that sought to determine whether the PAA Senegal project process, well after the withdrawal of WFP, will continue to function normally with respect to the production and marketing of paddy rice or with the regular provision of white rice to schools. On the one hand, sustainability issues examine the ability of producers to continue to obtain good yields and market their grain surplus after the withdrawal of PAA Senegal; on the other hand, they examine the ability of the government to provide the beneficiary schools with resources to ensure the smooth running of their school canteens. For the producers, the chances of sustainability decreased. Indeed, PAA responded to lessons learned from the first phase of the project by closely involving state departments such as the PAPIL, PADAER and DRDR. Each of these partners played a specific role, especially in relation to the strengthening of producers' capacities, the supply of inputs and equipment, and the technical monitoring of crops. With respect to the marketing aspect, PAA Senegal relied on SODEFITEX to purchase paddy rice and on PADAER for the marketing of seed production. This leads one to note that one way or another producers will receive support even after the PAA project has been completed. However, there are two challenges to

overcome in the PAA process: the first, and most important one, is the free-access system that was set up and which could make it difficult to switch to another system where producers must fully pay for all costs relating to agricultural inputs and equipment. The payment of the costs of other partners being assisted by PAA Senegal is the second challenge.

**97. The inability of the communities to replace PAA Africa Senegal in the financing of school canteens.** Regarding school canteens, it is questionable whether they will continue to function normally after the withdrawal of PAA. The number of schools benefiting from canteens dropped from 180 to 90 in two academic years and, by the end of November 2016, no school was running its canteen. The continuity of operating school canteens is a battle that is far from being won. Moreover, schools benefiting from PAA Senegal have not learned how to source directly from local producers to the extent that the dealings between the two categories of beneficiaries have not been tested by the project. However, buying local products to feed the students is PAA Africa's pioneering idea. How can the concept become functional if the project ends before the concept is tested? The sustainability of school canteens set up under the programme may also be examined from the point of view of financing. During the focus groups, producers indicated that it is difficult, or impossible, for communities to provide rice freely to schools, as surplus production is marketed to address spending on education, health and other household needs. While communities will continue to support canteens, their contribution will not be sufficient to ensure beneficiary students have a supply of food in the quantity and quality of a normal operating school canteen. Hence the need for the government to substitute PAA Africa Senegal by funding schools and providing schools with adequate financial resources. Will such a condition be fulfilled?

**98. Will the government fund the beneficiary school canteens of PAA Africa Senegal?** From the beginning of the 2016/2017 school year, the Government of Senegal has introduced reforms to the financing of schools by transferring 3,700 CFA per student to an account opened by the school's management committee, of which 16.4 percent must be allocated to the school canteen. While this measure should help ensure the sustainable public financing of canteens, the resources allocated are still limited. Furthermore, the Government of Senegal has several policy levers it should employ to ensure sufficient financing for school canteens in rural Kédougou to acquire their food locally and provide students with an adequate daily ration. First, as a part of its social protection policy for the poor, a portion of the resources should be allocated to the school canteen programme, which is considered to be a social safety net. Second, the one billion francs annual budget allocated by the Ministry of National Education to the school canteen programme should be substantially increased so as to better cover the basic needs of canteens. Given the significant increase in public resources recorded in recent years and the good prospects for economic growth posted by the country, freeing up an additional several billion francs for food in schools is sustainable from a budgetary perspective.

99. The development of an autonomous nutrition programme for schools planned by the Ministry of National Education in 2017 should offer official goals for coverage, types of rations, annual budgets and the programme funding contribution expected from all national partners, including the central state. This programme must also demonstrate the fiscal sustainability of the state's projected contribution and submit strong advocacy material to the Minister of Economy and Finance, the parliament and local councils in order to sway public opinion and make school feeding one of the prioritized policies of the national strategy for combating poverty, malnutrition and school drop-outs.

#### **4.2. Conclusion and recommendations**

Overall, PAA Africa Senegal's agriculture component has experienced some success even if it was not possible to rigorously assess its impact independently from the influence of other projects also targeting the same farmers. The implementation of the school feeding component has encountered significant challenges, mainly due to the lack of financial resources that WFP was provided with during the first two years from the launch of the Kédougou project. The following recommendations are based on information collated during the assessment of the project's consolidation phase.

<b>Recommendations</b>	<b>Strategic/ operational recommendations</b>	<b>Implementation delays</b>	<b>Expected effect</b>	<b>Technical difficulty/ risk level</b>	<b>Economic costs or gains</b>
<b>Agriculture</b>					
1. Support producers' unions to find diverse markets so that SODEFITEX is not the only outlet for their rice production surplus.	S	Short term	Moderate	Moderate	Lower cost High economic gains
2. Support producers in integrating into a credit system ensuring regular access to agricultural equipment and quality inputs.	O	Medium term	High	Low	Low cost
3. Ensure that training for producers is carried out in a convenient manner that is extremely accessible for them.	S	Medium term	High	Low	Average cost Low economic gains
4. Assist producers with post-harvest activities, including threshing, dehusking and sorting.	O	Short term	High	Moderate	Lower cost High economic gains
5. Supporting producers' unions to strengthen their negotiating capacity, and to find diverse markets so that	S	Short term	High	Moderate	Lower cost

SODEFITEX is not the only outlet for their surplus production.					High economic gains
<b>Education</b>					
6. In addition to the fight against food insecurity among children, PAA Senegal Africa should make the prevention and reduction of early school drop-outs its primary objective in assisting primary education in Kédougou.	S	Medium term	Moderate	High	Low cost Low economic gains
7. Raise public awareness so that communities commit to providing food at schools.	O	Medium term	High	Moderate	Lower cost High economic gains
8. In order to promote healthy eating habits, the project was to provide education for a balanced diet in schools.	S	Medium term	Moderate	Moderate	Low cost
9. Include bleach in the minimum package of products to be supplied to schools.	O	Long term	High	Low	High cost High economic gains
10. Find practical solutions for the storage of food and kitchen utensils in good conditions in schools.	O	Long term	High	Student	High cost
11. Ensure compliance with WFP's official food ration. The distribution of rice only is a practice that should not be encouraged.	O	Average time	High	High	Average cost High economic gains
12. Include in project activities, the monitoring of dietary rations that are actually served to students, and monitor education of a proper diet.	O	Medium term	High	Low	Low cost High economic gains
<b>Governance</b>					
13. Improve communication between project beneficiaries and other local and national stakeholders, including the prospects of project coordination.	S	Short term	High	Low	Low cost

14. Collect quantitative data for a more rigorous assessment of the portion of the project relating to agricultural impacts. Anthropometric measures may be taken regularly by WFP to verify that the nutritional status of students in beneficiary schools has improved.	S	Long term	Moderate	High	High cost Low economic gains
15. Only start a project in the PAA Senegal Africa extension phase if its funding has been acquired for the duration of the extension phase. FAO and WFP must ensure that any projects included in the extension phase will be adequately funded.	S	Short term	High	Student	Low cost
16. Reduce administrative procedures to prevent delays in paying for local foods.	O	Average time	High	Low	Average cost High economic gains
17. Establish direct contact between schools and local producers supported by the project to ensure that school canteens are supplied with local products and thereby implement the Purchase from Africans for Africa concept.	O	Medium term	High	Low	Low cost High economic gains
18. Involve the General Delegation for Social Protection and National Solidarity in creating the PAA Africa Senegal extension phase in order to obtain a contribution to the financing thereof.	S	Medium term	Moderate	High	Low cost Low economic gains
19. Involve any administrative and technical departments that are decentralized from the government to ensure greater local ownership of projects during the PAA Africa Senegal extension phase.	S	Short term	High	Low	Lower cost High economic gains
20. Develop a strategy for mobilizing communities (producers, parents of students, businesses and local officials) for a greater	S	Medium term	Moderate	Moderate	Average cost High economic gains

contribution to the smooth functioning of canteens.					
21. The terms of reference must be limited to the main issues and ensure that the available data can provide them with a response.	S	Medium term	Moderate	Low	Low cost
22. Support the Government of Senegal in the development of an autonomous national food in schools programme capable of taking over from PAA Africa and from other WFP programmes helping with nutrition in schools.	S	Medium to long term	High	Medium/high	Lower cost High economic gains

## **Annexes**

### **Annex 1: Terms of reference**

*Annexed separately*

## **Annex 2: Sampling strategy**

The strategy of sampling schools and producers' organizations was the following for the qualitative and quantitative analysis.

### **A. Establishment of the treatment and control groups**

- From the StatEduc database of the Ministry of National Education all public primary schools were selected in the three districts (arrondissements) where PAA-Senegal was involved in the Kédougou region and in the control arrondissement.
- Three categories of schools were identified: schools benefiting from the PAA-Senegal project, schools having a school canteen and supported by a donor other than WFP, and schools without a school canteen.
- Some observable characteristics of schools – different from their educational performances – were identified: (i) number of students by pedagogical group during the year preceding the start of the PAA-Senegal; (ii) type of facility/venue (whether a classroom under temporary shelters was in place before the start of PAA-Senegal or not); (iii) existence of a complete educational cycle (i.e. grades of primary education) before the start of PAA-Senegal; and (iv) existence of school committee management, etc. (see Table A2 ).
- Descriptive statistics were done on these variables to verify if the beneficiary schools had the same characteristics of the non-beneficiary ones.
- Logit regressions were used to determine the propensity score which allowed to apply the matching.
- Selection of 85 primary school beneficiaries of the PAA located in rural areas.
- Application of different matching techniques (kernel, nearest neighbour and radius) to identify, in each of the two categories of non-beneficiaries of PAA-Senegal, which schools have characteristics as close as possible to those of the 85 beneficiary schools.
- Checking the quality of the matching using different statistical techniques (pseudo R<sup>2</sup>, standardized mean absolute bias reduction).
- Validation of the three samples of schools: the project beneficiary schools (treatment group); schools with a school canteen and not supported by WFP (control group 1); and schools that do not have a school canteen (control group 2).

### **B. Selection of schools to interview**

- From each beneficiary district, three schools were randomly chosen (treatment group); likewise, three schools were selected from non-beneficiary districts (control group). This gave us a total of 12 schools. Interviews were conducted in these schools. One in each category was randomly selected to organize all focus groups of the district (a total of four schools).
- Listing of schools where individual interviews were organized (the list is called LE1).
- Listing of schools where focus groups were organized (the list is called LE2).
- These lists make it possible to inform, in a timely manner, the directors of schools and the managers of the economic interest groups (GIEs) or farmer unions who find themselves near the schools.

### **C. Selection of producers' organizations to interview**

- Listing of producers' organizations actually supported by the project as well as the nearby localities of the schools in the control groups.
- Pairing producer organizations with schools in the treatment group: for each school, we identified a producer's organization benefiting from the project that was located in the same village or nearby villages where the interviews took place. This exercise was conducted with the support of the FAO country office in Senegal (FAOSN) and the WFP team.
- Listing of producers' organizations matched to 60 schools in the treatment group.
- Listing of producers' organizations matched to schools where individual interviews were organized (LO1).
- Listing of producers' organizations matched to schools where focus groups were organized (LO2).

### **D. Focus groups in schools and interviews with producers' organizations**

- In each district, a focus group involving mothers who prepare school meals was organized into one out of the three schools selected for interviews (in total four focus groups).
- In each district, a focus group involving students (parity between girls and boys) was organized in one out of the three schools selected for interviews (in total four focus groups).
- In each arrondissement, a focus group bringing together farmers (some groups exclusively gathered men or women only) was organized with the producers matched to the school chosen for interviews (in total four focus groups).
- Individual interviews in schools and producer organizations.
- In each district, the directors of the three selected schools were interviewed (in total 12 individual interviews).
- In each district, a teacher was interviewed in each of the three selected schools (a total of 12 individual interviews).
- In each arrondissement, the president of the beneficiary producer organization of each locality was interviewed (in total three individual interviews).
- Interviews with the three presidents of farmer unions (a total of three interviews).
- Interviews were conducted with two presidents of GIE in each of the three beneficiary districts. These presidents were randomly selected from all GIE members of the producers' unions in the district (in total six interviews).

**Table A2.1: Descriptive statistics for selected variables for PAA's beneficiary and non-beneficiary schools baseline 2011**

Variables	School without PAA school feeding		School with PAA school feeding		Standard deviation ( <i>t de Student</i> )
	Mean	Standard error	Mean	Standard error	
<b>School characteristics</b>					
Cycle type (incomplete = 1)	0.95	0.023	0.67	0.050	0.272 (0.000)***
Type of premises (temporary shelter = 1)	0.70	0.047	0.26	0.047	0.446 (0.000)***
Teacher's academic degree (bachelor's degree = 1)	0.36	0.050	0.37	0.054	-0.013 (0.859)
Teacher professional diploma (CAP = 1)	0.58	0.051	0.78	0.046	-0.205 (0.004)***
Student-teacher ratio	31.31	1.353	31.34	1.055	-0.033 (0.984)
Number of students per group	24.52	0.922	26.26	0.946	-1.741 (0.189)
Existence of school management committee (yes = 1)	0.52	0.051	0.88	0.034	-0.366 (0.000)***
Existence of parents' association (yes = 1)	0.87	0.034	0.98	0.016	-0.105 (0.009)***
Existence of school project (yes = 1)	0.94	0.025	0.99	0.011	-0.052 (0.070)*
Presence of latrines (yes = 1)	0.17	0.039	0.71	0.049	-0.533 (0.000)***
<b>School performance</b>					
Enrolment rate (proxy: % new CI registrants)	100	0.00	99.80	0.198	0.198 (0.205)
Repetition rate (%)	2.74	0.322	3.01	0.955	-0.274 (0.775)

Drop-out rate (%)	11.93	0.808	12.59	0.819	-0.659 (0.567)
Success rate at CFEE (%)	95.98	1.691	84.67	5.706	11.31 (0.216)

Notes: CI = introductory course; CAP = teaching certificate; CFEE = certificate of completion of elementary education.  
Source: Calculation made from DPRE/MEN data.

### Annex 3: List of questionnaires and focus groups

**Table A3.1: List of focus group discussions**

Number of focus group discussions	District	Gender	Type of role in the project	Number of participants	Venue
1	Dimboli	Mixed	Students	8	School of Bombaya
2	Dimboli	Women	Mothers preparing food in school feeding	4	School of Bombaya
3	Dimboli	Women	Producers	6	Dimboli
4	Dimboli	Men	Producers	6	Dimboli
5	Bandafassi	Mixed	Students	12	School of Boundoucondi
6	Bandafassi	Women	Mothers preparing food in school feeding	6	School of Boundoucondi
7	Bandafassi	Mixed	Producers	6	Bandafassi
8	Dar Salam	Mixed	Students	8	School of Banfaroto
9	Dar Salam	Women	Mothers preparing food at school feeding	7	School of Banfaroto
10	Dar Salam	Women	Producers	6	Dar Salam
11	Dar Salam	Men	Producers	6	Dar Salam
12	Khossanto	Mixed	Students	8	School of Namaya
13	Khossanto	Women	Mothers preparing food at school feeding	9	School of Namaya
14	Khossanto	Mixed	Producers	8	Khossanto

**Table A3.2: List of individual questionnaires**

Questionnaire number	District	Gender	Type of role in the project	Venue
1	Dimboli	Men	Director	School of Bombaya
2	Dimboli	Women	Teacher	School of Bombaya
3	Dimboli	Men	Director	School of Dimboli
4	Dimboli	Men	Teacher	School of Dimboli
5	Dimboli	Men	Director	School of Bowal
6	Dimboli	Men	President of the producers' union	Kafouri-Dimboli
7	Dimboli	Women	President of GIE	Kafouri-Dimboli
8	Dimboli	Men	President of GIE	Kafouri-Dimboli
9	Bandafassi	Men	Director	School of Boundoucundi
10	Bandafassi	Men	Teacher	School of Boundoucundi
11	Bandafassi	Men	Director	School of Habibou
12	Bandafassi	Men	Teacher	School of Habibou
13	Bandafassi	Men	Director	School of Ibel
14	Bandafassi	Women	Teacher	School of Ibel
15	Bandafassi	Men	President of the producers' union	Bandafassi
16	Bandafassi	Women	President of GIE	Bandafassi
17	Bandafassi	Men	President of GIE	Bandafassi
18	Dar Salam	Men	Director	School of Banfaroto
19	Dar Salam	Men	Teacher	School of Banfaroto
20	Dar Salam	Men	Director	School of Leybar
21	Dar Salam	Men	Teacher	School of Leybar
22	Dar Salam	Men	Director	School of Dar Salam
23	Dar Salam	Men	Teacher	School of Dar Salam
24	Dar Salam	Men	President of GIE	Dar Salam
25	Dar Salam	Men	President of GIE	Dar Salam
26	Dar Salam	Men	President of producers'	Dar Salam

			union	
27	Khossanto	Men	Director	School of Namaya
28	Khossanto	Men	Director	School of Kobokhoto
29	Khossanto	Men	Director	School of Tourokhoto
30	Khossanto	Men	Director	School of Massa Massa
31	Khossanto	Men	President of GIE	Khossanto
32	Khossanto	Men	President of producers' union	Khossanto

#### **Annex 4: Evaluation matrix**

*Annexed separately*

## Annex 5: Logical framework

Subject	Indicators	Verification tool
<b>Objective:</b> Project objective: To improve student food security and subsistence farmers' incomes and to enhance the sustainability of the school canteens programme through local purchases of cereals for school canteens.	% of beneficiary households having improved coverage of their cereal needs and incomes; % of school canteens in the region fuelled by project rice production; % of students receiving a meal per day.	Final report of the project
<b>Planned Activities and Expected Outputs</b>		
<b>Result 1: 1,000 vulnerable rural households affiliated with three rice producers' unions receive a kit of seeds and fertilizer to develop 2,500 m<sup>2</sup> of lowland rice cultivation.</b>	Number of households, GIEs and unions supported in their rice production; ratio of households to beneficiaries; area sown.	List of producers, GIEs and unions; report of the operational partner
Activity 1.1: Definition of institutional, technical and operational partnerships, letter of agreement and contract available.	Number of contracts and letters of agreement signed with partners.	Contracts and letters of agreement
Activity 1.2: Identification of unions and targeting of GIEs.	Number of GIEs of producers (former GIE/renewed producers, new GIEs/producers retained, number of unions retained).	List of producers' GIEs and unions; note on sampling method
Activity 1.3: Provision and distribution of inputs to project beneficiaries.	Quantity of certified seeds of rice and fertilizer (urea and 15-15-15) distributed.	Report of the operational technical partner
Activity 1.4: Set up and distribution of outputs to the beneficiaries to conduct the community seed component	Quantity of certified seeds of rice and fertilizer (urea and 15-15-15) distributed.	Report of the operational technical partner
<b>Result 2: 1,000 beneficiary households have increased their production and income.</b>	Rate of increase in average yield; rate of increase in average income per beneficiary household; % of households having increased their incomes; % of households having increased their production.	Activity report of the partner; project effects
Activity 2.1: Consolidation and updating of the extended baseline study with gender mainstreaming; indicators are defined.	Indicators are defined; indicators on the baseline situation are reported (availability of information on the project coverage area).	Evaluation report; report of the operational technical partner; joint (FAO/WFP) report of focal points; producers sheet fulfilled

Activity 2.2: Evaluation of the effects of the project: survey of unions, GIEs and beneficiary households (GADEC) in a gender approach.	Area sown; yields; productions; income; cereal needs rate.	Evaluation report
<b>Result 3: Three rice GIE unions sold 250 mt of white rice 50 percent to WFP</b>	Quantity of paddy rice produced under the project; quantity of husked or paddy rice purchased by WFP from unions; number of schools covered by project rice production; number of students benefiting.	Follow-up report; project evaluation report
Activity 3.1: Support for the formalization of labour relations between producers and their organizations (training in contract management).	Number of GIEs and households within the union who have been contracted by PAA; % of producers who have signed a contract with PAA: 100 percent.	Activity report of the operational partners
Activity 3.2: Establishment of contracts between the GIE unions and the WFP for the purchase of 250 mt of paddy rice.	Number of signed tripartite contracts: forward purchase contracts with the 03 GIE unions.	Activity report of the operational partners
Activity 3.3: Signing of contracts with GADEC for awareness-raising/animation community collection and transport of rice.	Number of mobile husker units put in place	
Activity 3.4: Signature of contract with Yellitaré for rice husking.	Quantity of rice harvested and husked	
Activity 3.5: Purchase of rice (250 mt).	Quantity of purchased white rice sold by GIE to WFP.	
Activity 3.6: Distribution of 225 mt of broken white rice, 50 percent to students in targeted schools.	Quantity of white rice sold by GIE to WFP.	
<b>Outcome 4: 180 schools were supplied and the needs of students covered through project production</b>	Number of schools covered by rice production; food needs rate for schools.	Monitoring report of the canteens' programme
Activity 4.1: Delivery of purchased rice to schools (two half-yearly deliveries).	Quantity of food delivered to schools.	
Activity 4.2: Distribution of 253 mt of white rice, 50 percent to students in targeted schools.	Quantity of rice distributed to students; number of students covered by the project.	
Activity 4.3: Reinforcement of the institutional and technical capacities of the different actors (canteen/School Inspectorate/IE, school management committees, producers).	Number of government staff members; number of school management committee members trained/strengthened through local purchases.	Project monitoring report
<b>Outcome 5: Three GIE unions and 50 GIEs improved their organizational dynamics and strengthened their technical and managerial abilities</b>	Number of unions and GIEs trained; number of unions and GIEs that have improved their managerial skills.	Training report; follow-up report

Activity 5.1: Recycling and practical reinforcement of the unions' capacities in organizational dynamics; formalization of labour relations; administrative and financial management of the unions; collection, storage, marketing, etc.	Number of courses held; number of training sessions per theme; number of training days per session; number of men/women participants).	Training report
<b>Outcome 6: Capacities of institutional partners in local purchasing policy are strengthened</b>	Number of courses; number of sessions per training; number of days per session; number of men/women participants; local purchasing policy document.	Training report
Activity 6.1: Training for the School Feeding Division and the devolved services of the Ministry of National Education in the preparation of a transparent procurement policy and its extension.	Number of trainings; number of sessions per training; number of days per session; number of men/women participants.	
Activity 6.2: Capacity development of institutional partners in local procurement policy (DGPSN/MEN and MAER).	Number of focal points and agents of the decentralized state structures involved in the implementation of a local procurement policy.	Follow-up report of FAO and WFP

## Annex 6: Documents consulted

Document type	Comment/titles and dates of documents received*	Received – Y/N (N/A)	Link to evaluation matrix
Project related documents (if applicable)			
Appraisal mission report	<p>Mission de Suivi et préparation de l'évaluation PAA – Rapport de Mission (SE-CNSA, MEN, MAER, CSA, WFP, FAO)</p> <p><i>Rapport de Mission D'appui au Secrétariat Exécutif Pour l'organisation du Forum Sur le Projet "Purchase from Africans for Africa"</i></p>	Y	
Project document (including logical framework in annex)	<p>Stratégie de Pérennisation et d'Extension de la Composante Sénégal du projet PAA Africa (FAO-WFP)</p> <p>Logical framework was included in the terms of reference and also in the Excel document "PAA Africa Programme Phase II – Country Status Report" (WFP-FAO) (December 2014)</p>		
Standard project reports		N/A	
Budget revisions	We found some information on the documents received, but nothing very precise on the budget and on the budget revision	N	
Note for the record from Programme Review Committee meeting (for original operation and budget revisions if any)		N	
Approved Excel budget (for original intervention and budget revisions if any)		N/A	
Intervention/project plan (breakdown of beneficiary figures and food requirements by region/activity/month and partners)	<p>Progress of activity (September 2015)</p> <p>Extension du PAA à la Vallée du Fleuve Sénégal et en Casamance : Renforcement Des Moyens d'Existence des Ménages Ruraux à Travers des Initiatives d'Achat Locaux d'Aliments</p>	Y	
Other			
Country office strategic documents (if applicable)			
Country strategy document (if any)	Stratégie de Pérennisation et d'Extension de la Composante Sénégal du projet PAA Africa (FAO-WFP)	Y	

Other			
Assessment reports (if applicable)			
Comprehensive Food Security and Vulnerability Assessments		N	
Crop and Food Security Assessments (FAO/WFP)	Extension du PAA à la Vallée du Fleuve Sénégal et en Casamance : Renforcement Des Moyens d'Existence des Ménages Ruraux à Travers des Initiatives d'Achat Locaux d'Aliments  Rapport du Diagnostic (October 2012)	Y	
Emergency Food Security Assessments		N	
Food Security Monitoring System Bulletins		N	
Market Assessments and Bulletins		N	
Joint Assessment Missions (UNHCR/WFP)		N/A	
Inter-Agency Assessments		N	
Rapid needs assessments		N	
Cash and voucher feasibility studies		N	
Other			
Monitoring and reporting (if applicable)			
M&E plan	PAA Africa Senegal – Phase II – Midterm Monitoring Report, Draft (IPC-IG) (May 2016)	Y	
Country situation report	Rapport du Diagnostic (FAO-WFP)	Y	
Country executive brief	Résumé executive du Projet	Y	
Food distribution and post-distribution monitoring reports		N/A	
Monthly monitoring reports	Rapport de mission and mission de suivi	Y	
Beneficiary verification reports		N/A	
Donor specific reports	Concept Note – Scaling up Purchase from Africans for Africa: support government-led initiatives of food procurement from small farmers for social protection	N/A	
Output monitoring reports (if applicable)			

Actual and planned beneficiaries by activity and district/location by year	PAA Africa Senegal – Phase II Midterm Monitoring Report, Draft (IPC-IG) (May 2016)  Concept Note – Scaling up Purchase from Africans for Africa: support government-led initiatives of food procurement from small farmers for social protection.	Y	
Men versus women beneficiaries by activity and district/location by year	PAA Africa Senegal – Phase II Midterm Monitoring Report, Draft (IPC-IG) (May 2016)  PAA Africa-Senegal progress of activities (September 2015)	Y	
Beneficiaries by age group		N	
Actual and planned tonnage distributed by activity by year		Y	
Commodity type by activity	“PAA Africa Programme Phase II – Country Status Report” (WFP-FAO) (December 2014)  Progress of Activity (September 2015)	Y	
Actual and planned cash/voucher requirements (USD) by activity by year		N	
Operational documents (if applicable)			
Organigram for main office and sub-offices	PAA Africa Senegal – Phase II Midterm Monitoring Report, Draft (IPC-IG) (May 2016)  Stratégie de Pérennisation et d’Extension de la Composante Sénégal du projet PAA Africa (FAO-WFP)	Y	
Activity guidelines	“PAA Africa Programme Phase II Country Status Report” (WFP-FAO) (December 2014)  Progress of activity (September 2015)  Terms of reference	Y	
Mission reports	Mission de suivi et préparation de l'évaluation PAA – Rapport de Mission (SE-CNSA, MEN, MAER, CSA, WFP, FAO) (May 2015)		
Pipeline overview for the period covered by the evaluation	Terms of reference PAA Africa Senegal – Phase II - Midterm monitoring Report Draft (IPC-IG)(May,2016)		
Logistics capacity assessment			
Partners (if applicable)			
Annual reports from cooperating partners		N/A	

List of partners (government, NGOs, United Nations agencies) by location/activity/role/tonnage handled	Terms of reference PAA Africa Senegal – Phase II - Midterm monitoring Report Draft (IPC-IG)(May,2016)  Extension du PAA à la Vallée du Fleuve Sénégal et en Casamance : Renforcement des Moyens d'Existence des Ménages Ruraux à Travers des Initiatives d'Achats Locaux d'Aliments	Y	
Field-level agreements, Memorandum of Understanding		N/A	
Cluster/coordination meetings (if applicable)			
Logistics/food security/nutrition cluster documents		N/A	
Note for the record of coordination meetings		N/A	
Other			
Evaluations/reviews			
Evaluations/reviews of past or ongoing operation		Y	
Resource mobilization (if applicable)			
Resource situation		N	
Contribution statistics by month		N	
Resource mobilization strategy		N	
Note for the record donor meetings		N	
Maps (if applicable)			
Operational map	Terms of reference, PAA Africa Senegal – Phase II – Midterm Monitoring Report, Draft (IPC-IG) (May 2016)	Y	
Logistics map		N/A	
Food/cash/voucher distribution location map		N/A	
Food security map		N/A	
Other documents collected by the team (including external ones) (if applicable)			

Regional assessment	Service Régional de la Statistique et de la Démographie de Kédougou - Situation Economique et Sociale Regionale. Document downloaded from the National Agency of Statistics and Demography (ANSD) website.	N/A	
Specify			*

The documents described in the annex were received 27 September 2016 except for the terms of reference, which were received in May 2016.

## **Annex 7: Stakeholders interviewed**

List of people contacted in the field in Kédougou

### **TAMBACOUNDA:**

- PAA Monitoring focal point: Salif TOURE
- BAMTAARE: Direction Goulé GUEYE

### **DAKAR:**

- FAO focal points: Abdoulaye THIAM and David PATRICK
- DCas: Abdoulaye TOURE

WFP sub-regions:

### **Commune of Kédougou:**

- Secretariat of the governor's region: Mme DIALLO
- DRDR: Head of Service: Mamadou GUEYE
- SDDR: Head of Service: Mignane DIOUF
- PADER: Coordinator: Hamat LY, Mamadou Lamine DIOP
- P2RS/PAPIL: Coordinator: Pape Codé WADE
- SECNSA of Kédougou: Mr KEBE
- BAMTAARE: Mohamadou KHOUMA
- SODEFITEX (manager of the rice mill) Kédougou: Fanding KEBE
- School Inspectorate: Cheikh FAYE
- Canteen Manager: Bruno TOUPANE
- GADEC: Coordinator: Mr DIALLO
- GADEC: Ex chef d'Antenne: Ousseynou BA

### **Commune of Dimboli:**

- Sub-prefect: Abdoul SY
- Mayor of Dimboli: Fodé KEITA
- President of the Union: Ousmane DIALLO
- President of the Dimboli School: Samba DIABAKHATE

### **Commune de Bandafassi:**

- Sub-prefect: THIANDOUM
- Mayor of Bandafassi: Mamadou Yoro BA
- Head of Bandafassi village: Moussa DIALLO
- President of the Union: Al Hassane BA
- Contacts in the union: Malale Barry and Souleye SIDIBE
- President of the Bandafassi School: Mamoudou CISSOKHO

**Commune of Dar Salam:**

- Prefect of Salémata: Adjoint: Dramé SECK
- Sub-prefect: Mr MBENGUE; Adjoint sous-préfet : Mr DIOP
- Mayor of Dar Salam: NDané Gassama
- President of the Union: Kandia DOUMBIA
- Inspectorate for Education and Training, IEF, of Salémata: Abdoulaye Gassama
- Canteens' Manager: Pape Oumar BA
- SDDR of Salémata: Guy Medang Valentin
- President of the Dar Salam School: Thierno BA

**Commune of BEMBOU:**

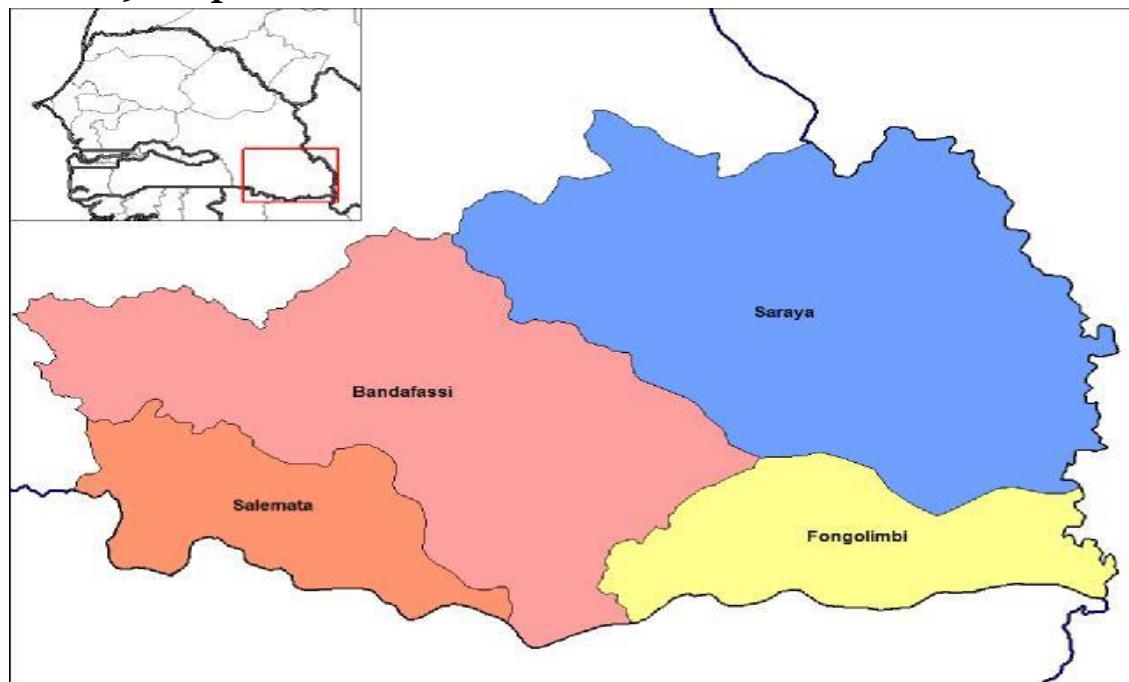
- Deputy Mayor: Salouma KEITA

Contact person: Niama DANFAKHA

## **Annex 8: Data collecting tools**

*Annexed separately*

## **Annex 9: Map**



## Annex 10: Contextual information on gender

Objectives	Indicators	Data sources
Nutrition	Prevalence of malnutrition (girls/boys)	<ul style="list-style-type: none"> <li>- Food security survey</li> <li>- Individual interview</li> </ul>
	Ratio height-for-age (girls/boys)	
	Ratio weight-for-age (girls/boys)	
	Body mass index (girls/boys)	
	Number of meals per day in the household usually taken during the lean season (distinguish between adult and child)	
Education	% of students enrolled (girls/boys)	<ul style="list-style-type: none"> <li>- StatEduc from Planning and Education Reform Direction</li> <li>- Departmental Inspection of Education (IEF Kédougou)</li> <li>- BALISE from “<i>Division des Cantines scolaires</i>”</li> </ul>
	Gender parity index (ratio girls to boys enrolled)	
	Attendance rate (girls/boys)	
	Grade repetition rate (girls/boys)	
	Drop-out rate (girls/boys)	
	Successful at CFEE rate (girls/boys)	
Health	Total education expenditure of the household (girls/boys)	<ul style="list-style-type: none"> <li>- Focus group</li> <li>- Individual interview</li> </ul>
	Children under 5 years mortality rate (girls/boys)	
	Children under 5 years morbidity rate (girls/boys)	
	Total health expenditure of the household (girls/boys)	
Agriculture	Quantity of seeds received by farmers (women/men)	<ul style="list-style-type: none"> <li>- BAMTAARE baseline survey from SODEFITEX</li> <li>- Programme documents</li> </ul>
	Land cultivated (women/men)	
	Total production of rice paddy (women/men)	
	Yields by 1 mt (women/men)	
	% of beneficiaries' farmer (women/men)	
	Average production of rice paddy sold by farmers (women/men)	
	Sale price of rice paddy in the intervention area before and after PAA Africa	
Capacity development	Agricultural inputs adoption (women/men)	<ul style="list-style-type: none"> <li>- Programme documents</li> <li>- Individual interviews</li> </ul>
	Credit access (women/men)	
	Local production (women/men)	
	Local institutions (women/men)	
	Women's empowerment	
	Budget management at the local level (women/men)	

Notes: CFEE = certificate of completion of elementary education; PAA Africa = Purchase from Africans for Africa.

## **Annex 11: Evaluation of the impact of PAA Africa Senegal on the school performances of rural public primary schools in the Kédougou region**

The impact of the PAA Senegal on school performances of public primary schools beneficiaries of the programme in the departments of the Kédougou region were estimated using the propensity score method. Three main steps have been followed.

1. The propensity score for each school is calculated. It corresponds to the probability of being a beneficiary of the programme because of observable characteristics (for example, the supervisory rate, teacher's diploma, deworming, presence of latrines, the completeness or incompleteness of the cycle of studies). The logit model is used to estimate propensity scores.
2. Once the propensity scores were obtained, we started to match the beneficiary producers with the non-beneficiaries in order to calculate the impact. Several methods of matching are used in this study: the nearest neighbour method, the kernel method, the radius method. However, there is a bias-efficiency trade-off concerning these methods (Caliendo, 2008).
3. The common support hypothesis was tested to assess the matching quality. To do this, a visual analysis was performed to see if there was an overlap between the distribution of the beneficiary group's propensity score and the one of the non-beneficiary group. This test is important because it ensures that all combinations of the characteristics of the beneficiary group can be observed also in the control group. Then, the balancing test was carried out to ensure that the differences between the observable variables of the two groups were eliminated. There are several versions of this test in the literature, but the reduction of the absolute mean bias suggested by Rosenbaum and Rubin (1985) is the most used one (Kassie et al., 2011). In addition to the "standardized mean absolute bias reduction" test, other methods were used to implement the "balancing test". As suggested by Sianesi (2004), the pseudo R<sup>2</sup> and the p-value test of the likelihood ratio of the significance of all regressors are the basis of the logit analysis to assess the quality of the matching. The pseudo R<sup>2</sup> should be lower after pairing and the joint significance test of the variables should be rejected.

Table A11.1 presents the results of the first step to estimate the propensity scores that will be used to matching the beneficiaries. Since there are two control groups, two models have been estimated using the logit regression. Both models predict positively the probability of being a beneficiary with good prediction rates of 83.48 percent and 82 percent depending on the model. The results show that the presence of latrines in schools is positively correlated to the probability that the school will be selected. Similarly, the presence of a management committee has a positive influence on the selection of schools by PAA. On the other hand, the rate of supervision, the professional degree and also the deworming campaign have no significant effect on the schools choice.

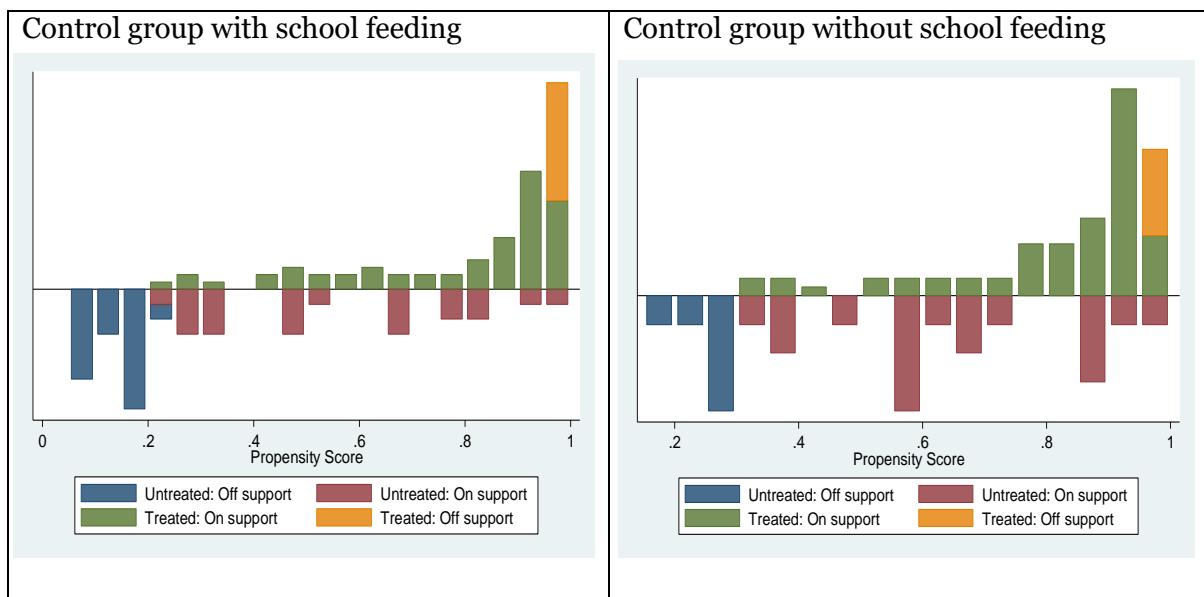
**Table A11.1: Probability that the school will be a beneficiary in 2011 (logit regression)**

Control variables	Model (1)			Model (2)			
	Control group with canteen			Control group without canteen			
	Coefficien	t	z	P>z	Coefficien	t	z
Supervision rate	-0.021	-0.86	0.392	0.023	0.76	0.445	
Professional diploma (ref = BFEM/CFEE)	-0.818	-1.42	0.156	-0.952	-1.57	0.116	
Presence of management committee (ref = no)	1.498**	2.38	0.017	1.237**	1.97	0.048	
Bilharzia deworming (ref = no)	0.850	1.14	0.255	-0.285	-0.43	0.670	
Intestinal deworming (ref = no)	-1.492	-1.75	0.10	0.158	0.18	0.854	
Latrine presence (ref = no)	2.925***	4.01	0.000	1.544**	2.48	0.013	
Garbage collection (ref = no)	0.057	0.07	0.948	0.069	0.09	0.932	
Cycle type (ref = incomplete)	2.228*	1.90	0.058	1.787	1.59	0.111	
Constant	-0.682	-0.68	0.495	-1.114	-1.05	0.293	
Number of observations			115			100	
Prob > chi2 =			0.0000			0.0011	
Positive prediction rate			83.48%			82%	
LROC			0.8964			0.8334	

Source: Calculation made from DPRE/MEN data.

The estimated propensity scores from both models are shown in the graphs below. This represents the basis on which PAA beneficiary schools are matched with non-beneficiary schools in both groups. For the first model (in which the control groups are represented by schools with school feeding activities funded by other donors), there are 81 schools (70.4 percent of the observations), of which 20 are non-beneficiaries and 61 are beneficiaries on the common support (Table A11.2). Concerning the second model, 84 schools are on the common support (84 percent of observations). These results indicate that the condition of a good matching is satisfied: there is a substantial overlap in the propensity scores of the two groups.

**Graph A11.1: Common support for the propensity score**



Source: calculation made from DPPE/MEN data.

**Table A11.2: Observations on the distribution of the common support**

	Control group with school feeding			Control group without school feeding		
	Off support	On support	Total	Off support	On support	Total
Untreated	18	20	38	6	17	23
Treated	16	61	77	10	67	77
Total	34	81	115	16	84	100

Source: calculation made from DPPE/MEN data.

The validation tests of the matching quality of the two models are presented in Table A11.3. According to this table, the pseudo R<sup>2</sup> of the two matches decrease significantly after the matching, passing from a value of 0.39 to a value between 0.012 and 0.3 according to the matching method applied. In addition, the joint significance test of the variables is rejected (p-value greater than 5 percent). Overall, the PSM reduced the average difference between the observables of the two groups by more than 80 percent. Ultimately, although Rubin's B does not validate the test, the results of the other tests suggest that the matching quality is satisfied.

**Table A11.3: Matching quality of the propensity score criteria**

Control group with school feeding funded by other donors							
Type of matching	Ps R2	Pseudo R2	P>Chi2	P>Chi2	B	R	
	Before matching	After matching	Before matching	After matching	Total percentage of bias reduction	After matching	After matching
Kernel (Gaussian)	0.39	0.012	0.000	0.978	87	26.1*	1.86
Neighbour	0.39	0.03	0.000	0.754	85	40.7*	1.76
Radius	0.39	0.027	0.000	0.803	84	38.7*	1.46

Control group without school feeding from other donors							
Type of matching	Ps R2	Pseudo R2	P>Chi2	P>Chi2	B	R	
	Before matching	After matching	Before matching	After matching	Total percentage of bias reduction	After matching	After matching
Kernel (Gaussian)	0.241	0.03	0.001	0.708	82	38.8*	2.10*
Neighbour	0.241	0.02	0.001	0.784	85	36.2*	2.48*
Radius	0.241	0.05	0.001	0.327	73	50.7*	1.30

Source: Calculation made from DPRE/MEN data.

## **Recall of the theoretical framework of the double difference evaluation method (DD)**

The double difference evaluation method assumes that the control group is subjected to the same temporal changes as the treatment group if the programme had not been implemented; this is the hypothesis of parallelism. It is expressed as:

$$E(Y_0^t - Y_0^\tau / T = 1) = E(Y_0^t - Y_0^\tau / T = 0)$$

Where  $Y_0^\tau$  and  $Y_0^t$  represent the outcome indicator for the initial period (at period  $\tau$ ) and the final period (at period  $t$ ) in the absence of the programme, and  $T$  the indicator variable for the treatment status (if the school is beneficiary of the PAA programme, otherwise  $T = 0$ ).

To illustrate, we consider the drop-out rate as the academic performance indicator that the PAA programme wants to change if it is effective. For one reason or another, children drop out of school because they are hungry, undernourished, etc. The above expression means that, on average, the change in the drop-out rate in the beneficiary school group would be the same as the change in the drop-out rate in the control group if the programme had not been put in place.

On the basis of this consideration, the measurement indicator is deduced from the effectiveness of the programme, as follows:

$$\Delta^{dd} = (E(Y^t / T = 1) - E(Y^\tau / T = 1)) - (E(Y^t / T = 0) - E(Y^\tau / T = 0))$$

The assessment indicator of this impact indicator can be written as follows:

$$\hat{\Delta}^{dd} = (\bar{Y}_t - \bar{Y}_\tau / T = 1) - (\bar{Y}_t - \bar{Y}_\tau / T = 0)$$

With  $\bar{Y}$  the average of the result indicator from the sample is calculated. The latter relationship is interpreted as follows: the double difference estimator is equal to the difference between the average variations in the result indicator of the beneficiaries' group and the control group. Moreover, it assumes that any difference between schools for any indicator is explained by the effects of the programme.

When we assess that the hypothesis of identical time evolution of indicators between schools is not respected, probably due to other factors that influence the outcome indicator, these factors are introduced in the analysis (if they are measurable of course), in order to control (correct) the evolution. Thus, it is assumed, at first, that the effects of these new variables are globally homogeneous and that the unmeasured (or non-measurable) individual characteristics of the schools are identical, or, in other words, they do not vary from one school to another. For example, the rate of supervision has the same effect on the repetition rate in all schools, and the effect of school management is the same in all schools, etc. In this case, the model is a panel with stacked data. Consequently, this hypothesis of global homogeneity is abandoned and a model with fixed individual effects which assumes that the specificities of the schools are different (in other words, there are unexplained differences between schools; for example, the motivation and managerial competence of the director, the way parents' associations work, difference between one school to another) is implemented. According to these hypothesis, three models are estimated: the model with no control variable, the model with overall homogeneity with control variables and the model with fixed individual effects with control variables.

## **Definitions of outcome indicators**

The performance indicators used in this report are the repetition rate, the drop-out rate, the rate of new introductory courses enrolled, which is considered a proxy indicator of the enrolment rate, and the results for the end-of-year certificate of completion of elementary education (CFEE). They are calculated by school. Their methods of calculation can be found below.

### **A. Repetition rate**

*Grade repetition rate at grade g in year t = number of repeaters at grade g in year t + 1 / effective at grade g in year t*

### **B. Promotion rate**

Rate of promotions to grade g in year t = newly enrolled at grade g + 1 in year t+1 / total enrolment at grade g in year t

### **C. Drop-out rate**

Drop-out rate to grade g in year t = number of students in grade g leaving in year t+1 / total enrolment at grade g in year t

### **D. Enrolment rate at CI**

Enrolment rate at CI in year t = new enrolled to CI in year t / total number of enrolled in year t

The proxy variable used to capture the enrolment rate is the percentage of new enrollees in the CI class. It is defined as follows:

### **E. Admission rate to CFEE**

This is the percentage of students admitted to the sixth grade at the end of the CFEE exam.

### **Change of variable**

Since the different indicators used are proportions, and thus ranging between 0 and 1, it is necessary to make a monotonic transformation in order to be able to apply the various statistical tests and economic models. In order to do this, the following logit transformation will be used:

$$y = \text{Logit}(Y) = \log\left(\frac{Y}{1-Y}\right)$$

Where Y is the indicator, and y is its transformation. This change of variable makes it possible to extend the domain of variation of the variables on the real line (see S. Stevens et al., 2016 for more details).

## **Annex 12: Acronyms**

APE	parents' association
BAMTAARE	Base Support Methods and Techniques for Agriculture, Rural Activities and the Environment
CAP	teaching certificate
CFA franc	franc of the French community in Africa
CFEE	certificate of completion of elementary education
CGE	school management committee
CI	introductory course
CRÉS	Consortium for Economic and Social Research ( <i>Consortium pour la Recherche Économique et Sociale</i> )
DAP	diammonium phosphate
DGPSN	General Delegation for Social Protection and National Solidarity
DPRE	Directorate of Planning and Reform of Education
DRDR	Regional Directorate of Rural Development
FAO	Food and Agriculture Organization of the United Nations
GADEC	Action Group for Community Development
GDP	gross domestic product
GIE	economic interest group ( <i>groupement d'intérêt économique</i> )
IEF	Inspectorate for Education and Training
IPC-IG	International Policy Centre for Inclusive Growth
MAER	Ministry of Agriculture and Rural Equipment (Ministère de l'Agriculture et de l'Équipement Rural)
MEN	Ministry of National Education
NGO	non-governmental organization
PAA Africa	Purchase from Africans for Africa
PADAER	Support Programme for Agricultural Development and Rural Entrepreneurship
PAPIL	Support Project for Small Local Irrigation

PSM	Propensity Score Matching
SADMAD	Programme for the Sustainable Food System and Fight against Malnutrition
SDDR	Departmental Service of Rural Development
SE-CNSA	Executive Secretariat of the National Food Security Council
SODEFITEX	Development Company of Textile Fibres
SRI	System of Rice Intensification
WFP	World Food Programme

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