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Independent Evaluation of the African Risk Capacity

Pilot Impact Country Study: Senegal

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Preface to the report

This report has been prepared as part of the Independent Evaluation of the African Risk Capacity (ARC), commissioned by the UK Foreign, Commonwealth and Development Office[1] (FCDO) and undertaken by Oxford Policy Management (OPM).

The lead author of the report is Stephen Jones (Study Director). Information collection for the studies on financing and capacity development was carried out by Andy Cook, Amacodou Ndiaye, and Cheikh Seck. The quantitative analysis of household impact was led by Donna Harris, working with Yoro Diaw and Papa Faye of Dadch & Co. Patrick Ward provided advice and quality review for the study. Jesse McConnell contributed to the study design and Jenny Congrave contributed to the management of the study. Debbie Hillier is the Project Manager for the Independent Evaluation of ARC and is the principal contact for this study (Debbie.hillier@opml.co.uk). The client contact at FCDO is Lloyd Cameron (Lloyd.cameron@fcdo.gov.uk).

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[1] FCDO was formed in September 2020 following a merger of the Department for International Development (DFID) with the Foreign and Commonwealth Office.

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Executive summary

Objectives of the study

The African Risk Capacity (ARC) was established to help African governments improve their capacities to plan, prepare, and respond to extreme weather events and natural disasters, through providing access to insurance, collaboration, and technical support, so as to protect the food security and livelihoods of vulnerable people.

This report forms part of the Independent Evaluation of ARC undertaken by Oxford Policy Management (OPM) over the period from 2015 to 2024, commissioned by the United Kingdom's Foreign, Commonwealth and Development Office (FCDO). This study is a pilot for the country case studies to be undertaken in the impact phase of the evaluation.

Senegal was selected as the pilot as a result of drought in 2019 triggering ARC insurance payments to both the Government of Senegal and the Start Network. The objectives of the study are:

1. to assess how far the provision of payments through ARC has contributed to reducing the loss of assets and livelihoods, and to protecting food security, for households in Senegal that are vulnerable as a result of rainfall deficit;
2. to assess how far ARC has contributed to strengthening the capacity of the Government of Senegal (GoS) to manage weather-related shocks, and to improving the availability of finance;
3. to identify lessons for ARC's future operations; and
4. to develop and test approaches for the future evaluation of ARC operations.

ARC and Senegal

Despite a strong record of political stability and economic growth, more than half the population of Senegal remains dependent on agriculture for their livelihoods; pastoralists and households dependent on rainfed crop production are vulnerable to the effects of drought. Senegal has been involved in ARC since the first risk pool in 2014/5, paying an annual insurance premium of CFA franc (CFA) 1.8 billion (about US$ 3.1 million) since 2014 with the cost being met from the government budget. A first insurance payment of US$ 16.5 million was made to GoS in 2015 in respect of drought in 2014. A Technical Working Group (TWG) has been established in Senegal to customise the Africa RiskView (ARV) model and develop contingency plans and ARC has provided technical support and capacity building for DRM.

ARC reached an agreement with GoS to participate in the 2018 ARC Replica initiative with Senegal being in the first group of countries to do this. This initiative allows humanitarian organisations to receive the support of replicated insurance policies that are purchased by ARC member states as a Replica partner. In Senegal the Replica partner is the Start Network, which comprises six international NGOs operating in the country. NGO donors financed the first premium payment under this arrangement in 2019.

Response to the 2019 drought

The 2019/20 crop year was characterised by very late rainfall in the agricultural and livestock production areas in the north and centre of Senegal, with more than half of survey respondents[2] describing the 2019 drought either as “severe” or the “worst remembered.” Based on operational plans developed with ARC support and early warning information, Final Implementation Plans (FIPs) were prepared to provide assistance to the most affected households for both the expected ARC and ARC Replica payouts. In December 2019, payouts were triggered under the insurance policies held by both GoS (US$ 12.5 million) and the Start Network (US$ 10.6 million).

The GoS FIP planned for rice distribution to almost 150,000 people in more than 18,600 households, along with supplementary feeding of children and pregnant and lactating women, and the provision of livestock feed to herd owners at sites in transhumance areas. Start Network planned activities included a cash transfer, supplementary feeding for children under five and pregnant and lactating women, and a nutrition awareness programme. The Start Network FIP aimed to reach 25,000 households (approximately 203,000 people).

The impact of COVID-19

As the threat to livelihoods from the economic disruption caused by the response to the COVID-19 pandemic became clear, the GoS decided to integrate the ARC support into a much larger National Response Plan (PNR). In April 2020, GoS launched an operation to support 1 million vulnerable households (plus a further 100,000 displaced households), or nearly 8 to 10 million people out of a population of 16 million, with a food kit consisting of five products for each targeted household. The other support included in the FIP was also implemented as part of the PNR, while the Start Network implemented its FIP in coordination with the GoS support. Delivery of the support took place over the period from April to August 2020, with the exception of the delivery of GoS nutritional interventions which were delayed till 2021.

Methodology

In line with the overall ARC evaluation design the approach for the study is theory-based, in that it focuses on testing the Theory of Change underlying the ARC model – in this case, as it has been implemented in Senegal. The impact evaluation approach is based on a contribution analysis which will be developed from the evidence collected across the rounds of evaluation research activities. The study has focused on two of the evaluation questions (EQs) defined in the ARC evaluation design, each relating to one of the pathways of impact defined in the ARC Theory of Change:

- To what extent has ARC contributed in Senegal to timely and effective responses that protect affected households’ livelihoods and prevent asset loss and food insecurity?

[2] From the Kimetrica Process Evaluation.

- To what extent has ARC influenced Senegal's capacity to anticipate, plan, finance, and respond to climate-related disasters generally, and more specifically to making best use of ARC?

It was originally envisaged in the ARC Evaluation design that primary data collection with a qualitative focus would be undertaken from households as part of a "participatory Impact Assessment" and that tools for this purpose would be developed in the pilot. However, since primary data from households was planned as part of the ARC-commissioned Kimetrica Process Evaluation and the Start Network evaluation, it was decided not to undertake additional primary data collection from households for this study. It was agreed with ARC Agency and Kimetrica that some additional questions would be included in the Process Evaluation to collect information of relevance to the wider ARC Evaluation. The resources originally intended for the participatory impact assessment were instead used to undertake exploratory econometric modelling of the effect of support on households.

The study methodology was based on three workstreams, addressing respectively finance for DRM, DRM capacity, and the impact on households of the support received. Data for the first two workstreams was provided by reviews of documentation and key informant interviews (KIIs), and the Kimetrica Process Evaluation, and was based around a comparison of the experience in addressing the drought crisis in 2014/15 with that of the combined drought and COVID-19 crisis in 2019/20. The analysis of the effect on households drew principally on survey data that was collected by the Kimetrica Process Evaluation and the Start Network Evaluation.

Summary of findings

Findings on contribution of ARC to financing DRM in Senegal

ARC provided a net total of US$ 20 million as insurance payments in December 2019. This amounted to the totality of external support received to address the drought (with the exception of some additional support for nutrition activities) and represented 28.9% of the estimated response requirement for a severe drought. However, funding to address the subsequent economic impact of the COVID-19 pandemic (with which drought relief funds were integrated) was on a far greater scale. ARC funding represented about 4% of the total support received by GoS to finance direct emergency relief for vulnerable households in response to the economic impact of COVID-19, with ARC Replica providing a further 4.3%.

Budgeting for the ARC insurance premium has largely replaced a previously higher but fluctuating annual budget for 'prevention and control of disasters', and has been integrated into the budget process, along with payouts under ARC insurance policies. ARC has therefore contributed to greater predictability in budgeting, while ensuring additional resources have been made available to deal with drought. However, GoS delayed making its payment of premium to ARC in 2018 (ultimately being deducted from the 2019 payment) and, following an unexpected increase in the premium due, did not make a premium payment in 2020. It has now paid for 2021/2.

Findings on contribution of ARC to strengthening capacity for DRM in Senegal

The main developments in Senegal's DRM capacity since 2014 relate to: (i) the intention to develop a stronger policy framework for DRM within the Sendai Framework, though the

process for developing a national strategy only began in November 2020; (ii) reorganisation of responsibilities between government agencies in particular following from the abolition of the Prime Minister's Office, though these have left unresolved the status of the ARC Steering Committee and funding arrangements for the TWG; (iii) improvements in the social protection system (with World Bank support) that have improved the identification of vulnerable households and that have developed models for cash transfer for government welfare grants, although these have not been used by GoS for disaster response, and there are weaknesses in the quality of the RNU used to identify vulnerable households; (iv) the establishment of the Start Network as the ARC Replica partner; (v) strengthened capacity for risk modelling, early warning, risk transfer, and operational planning; (vi) strengthened M&E approaches introduced by the Start Network, although GoS monitoring of disaster response has not improved significantly.

ARC has contributed to strengthening DRM capacity in Senegal principally through: (i) encouraging regular updates of operational plans and providing technical support to this process; (ii) ARC Replica's support to NGO initiatives through the Start Network; and (iii) provision of the ARV system, and training support for it, which has contributed to strengthened analytical capacity, although the ARV is not used for estimating support requirements, with reliance instead on the Cadre Harmonisé (CH) developed by CILSS. The effectiveness of capacity development support provided by ARC has to some extent been reduced by trained government staff moving on to other roles, but in some cases they remain working on DRM within NGOs.

Findings on ARC contribution to stakeholder commitment and cooperation

ARC has contributed positively to building stakeholder commitment and cooperation, in particular through providing a structured process around the insurance product (particularly preparing the FIP), which requires DRM actors to cooperate, and by supporting the establishment of the ARC Replica arrangement, which encourages structured cooperation between GoS and NGOs.

Findings on how improvements in capacity contributed to a more effective response to the 2019 drought and 2020 COVID-19 crisis

The difference in the scale and nature of the 2014/15 and 2019/20 crises makes a direct comparison difficult, but the study found that:

1. Significant improvements in the planning process contributed to the combined FIPs representing a strengthened approach to dealing with the drought in 2019 compared to earlier periods. The subsequent onset of COVID-19, and the development of the much larger PNR, meant that the GoS FIP was not implemented as planned, though it informed the subsequent PNR.

2. As in 2015, there were significant delays in the release of funds from the ARC payout to GoS by the Treasury due to delays in getting the appropriate authorisations and signoffs from senior level officials.

3. There were significant improvements in the approach to targeting as set out in the FIPs. However, the large increase in the number of beneficiaries in the PNR meant that this

approach was not implemented by GoS. The Start Network did implement its intended targeting approach, which revealed weaknesses in the RNU data.

4. A more rigorous review of gender issues in 2019/20 identified weaknesses, including a lack of female involvement in DRM planning, while GoS data collection still did not track distributions to female-headed households. Start Network's M&E system has, however, collected more comprehensive information related to gender.

5. There were no significant improvements in the M&E approach used by GoS. However, the M&E system used by the Start Network provided significantly more information about the effectiveness of support provided than had been available for the 2014/15 experience.

6. Implementation was adversely affected by both the travel and contact restrictions imposed in response to COVID-19 and the delay in releasing ARC funds. The main innovation compared to previous drought response was the use of cash transfers by the Start Network. This appears to have worked well, but the limited M&E information available (and the lack of a control group who did not receive aid) limits the extent to which the effectiveness of implementation overall can be assessed, and the degree to which comparisons of the effectiveness of alternative modalities can validly be made.

Findings on beneficiaries of support provided

The study found that the average beneficiary households as reported in both Kimetrica and Start Network surveys had around twelve members (compared to the planning assumption of eight) with more than two children under five. There were differences between the two surveys in terms of the percentage of male- or female-headed households and the Start Network households had more pregnant and lactating women, presumably reflecting different targeting processes for the fortified flour. The Kimetrica survey found a substantial number of households who received more than one type of support, while some others received none, which indicates targeting and distribution challenges.

There is very little systematic information on those who did not benefit from support. This represents a serious gap in monitoring how well assistance is targeted and in understanding the true impact of the interventions, as well as what outcomes look like in the households that were not supported through this period.

Findings on the extent to which the response effectively supported the livelihoods of the households

Almost all beneficiaries reported that the support helped them to avoid negative outcomes, and to assist with meeting food consumption requirements and improving the quality of food. Cash that was left over was used to pay off debts and to avoid other negative coping strategies. The distributions are likely to have prevented many households from having to resort to more extreme negative coping strategies, including buying food on credit or borrowing money to buy food, children working, and men undertaking high-risk and socially degrading or exploitative jobs. The Kimetrica process evaluation survey found that a high proportion of households (90%) reported that the main distributions (cash or food) helped prevent the distress sale of livestock and other assets.

The cash received under the Start Network support also helped prevent many households from having to resort to more extreme negative coping strategies. However, the effect of the support was limited and short-term. A majority of households reported having to use one or more of the coping strategies including borrowing to purchase food, skipping meals. Most respondents reported that the amount of cash received was insufficient to meet their household's basic needs, even just for a few weeks. While the total cash transfer was capped for a maximum of eight members per household, most households were larger than this (with an average household size of twelve). This does not seem to have resulted in their generally reporting worse outcomes, though households with seven or more children were found to be less likely to report having enough food in the household.

Households were significantly more likely to report having enough food if: they received larger cash transfers; they received additional assistance from another source; and they received fortified flour.

The quantity of rice provided may have lasted only a month or so for the average size of household reported in the surveys (twelve members). Flour distributions were constrained by the COVID-19-related restrictions, which made the procurement of quality flour a challenge. Most of the flour distributions by the Start Network were replaced by cash distributions.

There is a trade-off between the amounts transferred to beneficiary households and the total number of households that can receive support. Since we know very little about the households that did not receive support, it is difficult to know if the right balance was struck, and/or if coverage and total resources needed to be much higher.

The Start Network evaluation found that the selected support window generally aligned with when households were preparing for the lean season, although an earlier window may have been preferable. Beneficiaries generally reported that they received the money early enough, though some households also reported resorting to a range of coping strategies. GoS distributions, on a much larger scale, were undertaken slightly later than the Start Network distributions, starting in August 2020, suggesting that they will have come too late for some households. However, insufficient information is available to confirm this.

Summary of conclusions

Conclusions on household impact

The study concluded that Senegal's engagement with ARC contributed to the country being better placed to identify and respond to the emerging threat of drought during 2019 than it had been for earlier negative shocks. This was the result of the strengthening of capacity for operational planning and early warning, and engagement with the Start Network as well as the predictable provision of insurance payouts in December 2019. Delays to the release of ARC funds from the GoS Treasury, as had also happened in 2015, were a factor in the late implementation of the response to the drought.

The FIPs developed to use the ARC insurance payouts to address localised drought-related food insecurity were incorporated into (for GoS) or coordinated with (Start Network) the PNR through which GoS, with substantial additional external funding, provided support to address the shocks to livelihoods resulting from movement and contact restrictions to contain the spread of COVID-19.

There is evidence that the cash transfer helped the poorest households to avoid drastic coping strategies that could have a long lasting impact on their livelihoods, while in the least affected areas, households were able to increase their assets and food sources. While the level of support received was relatively limited and short-term, the evidence is that it achieved its objectives of reducing the extent to which households had to resort to negative coping strategies that were likely to have long-term effects on their livelihoods and assets, though evidence is insufficient to draw more detailed and disaggregated conclusions.

Conclusions on effectiveness of response and ARC's contribution

In addition to the provision of resources from insurance payouts, ARC's engagement with Senegal has contributed to strengthening GoS capacity for early warning and planning, while the ARC Replica initiative has improved coordination in the planning and delivery of relief among major NGOs, and between GoS and NGOs collectively. The funding of the Start Network through ARC Replica has also supported the use of cash transfers, and a strong approach to M&E, generating lessons that can be applied in the future by GoS. The process evaluations commissioned by ARC have also been valuable sources of evidence and lessons about the effectiveness of relief delivery. The positive experience with ARC Replica suggests that this arrangement may yield substantial benefits.

However, there are several aspects where weaknesses remain or that may pose challenges for the ARC model. These include: the fact that timing targets for the use of resources provided through ARC payouts to GoS were not met; the sustainability of DRM capacity without continuing ARC Agency support remains to be established; the lack of defined organisational arrangements for the ARC Steering Committee or of a budget for the TWG; late or unclear communications and engagement between ARC Ltd and the GoS resulting in no premium payment in 2020; and the weakness of M&E data.

Conclusions on the validity of the ARC Theory of Change

This study has shown that positive changes have occurred in Senegal along both Pathway 1 (supporting timely and effective response) and Pathway 2 (influencing policy and practice of member states). The evidence is summarised (with ratings) in the Contribution Analysis Matrix presented in Table 11.

In general the ratings are positive, with evidence that progress has been made along each of the ToC links at the effectiveness level. There is clear evidence that GoS capacity for effective response to climate-related shocks has improved (though some elements of the operational plan were not fully reflected in the FIP), even though the impact of COVID-19 radically changed the context of implementation and was far greater than the initial impact of the drought. Limitations relate in particular to the lack of progress in strengthening national M&E systems in support of DRM (particularly in relation to effective targeting), the failure to prevent a repeat of delays in approving the release of funds from the ARC payout, and evidence of some limitations in the timing and composition of the support provided to households.

There are some more significant challenges in relation to sustainability of the capacity developed, including the role of continuing ARC Agency support, the unresolved organisational and financing issues about the TWG, and uncertainty about whether the GoS

will continue to regard the purchase of insurance through the ARC arrangement as cost effective in the future.

Implications for monitoring and evaluating disaster response

Little progress was made between 2014/15 and 2019/20 in strengthening the national M&E system for DRM – with the important exception of the approach to M&E introduced by the Start Network. The only data that was available to make even limited quantitative judgements about household effects came from the Start Network M&E system and from the Kimetrica Process Evaluation. No data was available from national (GoS) sources. While the implementation report on the PNR provides details on the numbers of beneficiaries, and reviews lessons about operational effectiveness and challenges encountered, it is not possible to assess the effectiveness of targeting, and for example whether there were any groups who were not effectively reached by the support provided.

The study points to the need for a strengthening of the GoS M&E system, and suggests that greater attention should be paid by ARC Agency and donors and other regional and international agencies to encouraging the strengthening of national M&E systems for DRM. These would be strengthened by collecting systematic information on the effectiveness of targeting and on changes in beneficiary welfare over time (before and after the support is provided). Where it is considered appropriate and feasible to make a robust quantitative assessment of impact, surveys should be carried out with both beneficiaries and non-beneficiaries, so that it is possible to compare the beneficiaries of the intervention against a comparison group who share similar characteristics as those who received the intervention.

While resource availability and other may restrict what it is feasible to do in any given case, a coordinated and strategic national response to assessing household impact should be considered as part of a wider M&E strategy for DRM.

Implications for the ARC evaluation

The following lessons can be drawn from the pilot country case study:

1. The original intention, as set out in the Inception Report, had been to develop a participatory impact assessment (PIA) methodology as a core part of the case study approach for the impact phase. However, it is clear that in countries that have received ARC payouts, the Process Evaluations that ARC commissions overlap substantially with the envisaged PIA approach.

2. The approach and instruments developed for the assessment of the development of DRM capacity and ARC's contribution to it proved to be effective, though a more formally structured approach to the definition and measurement of DRM capacity should be developed.

3. Obtaining a clearer understanding of the conditions under which the ToC holds, and what underlying assumptions may fail to be realised in particular circumstances, will require examination of a wider range of national experiences (and not just of cases where insurance payouts have been made).

4. The approach to assessing the contribution to finance should not attempt to assess macroeconomic impact since this is not an objective of ARC support but should focus

on examining (a) the financing needs and the extent to which there were met by (b) ARC payouts, and (c) other sources of funding including any that ARC may have catalysed.

5. It is important to distinguish assessing the impact of ARC on the government's drought response from assessing the impact of the government's drought response on household welfare. The focus of the evaluation is on the former, although findings on the latter may provide information that is useful to it. While quantitative information on household level effects and other aspects of the performance of the national disaster response to which ARC has contributed (e.g. the effectiveness of targeting) is potentially valuable for understanding results achieved and challenges encountered in the government's drought response, it is beyond the resources and scope of the ARC Evaluation to collect quantitative primary data at household level. The ARC commissioning of Process Evaluations therefore plays an important role in providing information about this, as well as government monitoring systems.

6. The exploratory approach taken in this evaluation to try gain a better understanding of the impact of the drought response on beneficiary households, using modelling on limited data sets that were not designed to provide a quantitative measures of impact, provided limited and relatively weak evidence on impact. It was able to provide some information on the characteristics of beneficiaries and, for beneficiaries, on how self-reported outcomes varied in relation to the type of support received and with other household characteristics. It was not able to provide a more rigorous estimate of household level impact using a comparison of outcomes between beneficiaries and comparable non-beneficiary groups. This is because the data sets were limited (by design): they included only beneficiaries and used only self-reported post-distribution measures of welfare. It proved impossible to obtain other data that might have provided some external comparisons to understand how effective targeting had been. Given these constraints, the approach used does not, and was not intended to, provide an appropriate, general method for estimating household impact in future ARC evaluation work.

7. Consideration of the findings of the Senegal impact assessment also highlights several issues of importance that the study was not explicitly designed to address, or did not succeed in finding evidence about, that could potentially be addressed in the remainder of the ARC evaluation:

   a. the sustainability of the capacity development model including through support provided by ARC Agency;

   b. whether the resources and capacity available are sufficient to address any climate-related emergency needs (including minor or localised droughts) in years when ARC insurance payouts are not triggered;

   c. the appropriate way in which ARC-funded drought response and systems should be integrated with the wider social protection system;

   d. the appropriate national strategy in relation to the proportion of total relief costs that ARC insurance payouts should be covering in relation to the overall budget for disaster preparedness;

e. the factors that may influence the extent to which the success of ARC Replica in Senegal can be repeated in other countries.

For the remainder of the ARC evaluation, it is important to note a trade-off between the depth of investigation of each country and the number of countries for which information can be collected. Understanding better the conditions under which the ToC holds, and potential risks may require consideration of a wide range of national experiences reflecting different conditions, rather than more detailed investigation of a smaller number of experiences. There may also be a case for using evaluation resources to investigate further specific issues or themes across groups of countries, rather than focusing on individual country case studies.

Some of the issues emerging, identified above, are also not fully covered by the evaluation questions identified in the inception report. These considerations suggest a need for some revision to the evaluation questions for the ARC Evaluation to ensure that key emerging issues are properly addressed, and potentially for a revised approach to future country case studies.

Lessons

The following lessons from this study can be identified:

1. The ARC model can succeed in building national DRM capacity and improving response, though the extent to which this capacity may be sustainable without continued support through ARC Agency remains to be established.

2. The ARC Replica model can improve the effectiveness of coordination between NGOs, and between NGOs and government, and may provide an opportunity for more innovative approaches to the provision of support to be implemented, potentially providing lessons that can also be applied by government systems.

3. Making reliable empirical estimates of the household impact of drought relief and related aid would require a well-designed and integrated strategy for data collection and analysis, planned in advance of the onset of the emergency, and even then may be challenging to undertake in practice. National governments will need to decide on the feasibility and importance of this for any particular drought response.

Recommendations

Recommendations from the Process Evaluation

The ARC Process Evaluation produced recommendations that are set out in full in Annex E and are summarised below.

1. ARC should consider adjusting the ARV so that data can be disaggregated to lower administrative units.
2. ARC and the GoS should make efforts to align FIP preparation with the Harmonised Framework.
3. ARC and ARC-funded implementers should further detail the Standard Operating Procedures (SOPs) outlined in the FIP, specifically in relation to bank account

creation and management, communication and coordination, implementation, monitoring and evaluation, and gender and vulnerable group inclusiveness.
4. The GoS should consider updating the RNU database of beneficiaries.
5. The GoS and ARC should explore a more robust solution for the receipt and disbursement of ARC funding.
6. The GoS should consider expanding the selection of food items in distributions to promote better dietary diversity.
7. With regards to monitoring, we highly recommend that the Start Network conduct a workshop and share their monitoring processes and experiences with the GoS and ARC.
8. ARC should begin developing guidance that address multiple cascading events.
9. For future payouts, the GoS should consider channelling more funding to a revolving fund account to be used for early action
10. ARC and its country and Replica partners should continue to explore ways to take into account various marginalised groups (such as the elderly, sick, or disabled).

This study endorses these recommendations while suggesting the additional recommendations below.

Recommendations to ARC

ARC Agency should:

1. Use the lessons from the positive experience with ARC Replica in Senegal to inform and encourage the use of this model in other countries.

2. Strengthen the focus on improving government M&E within ARC Agency support. A wider range of evidence (including experience in other countries) will need to be drawn on to develop an appropriate approach but elements of this for consideration include:
    a. establishing a TWG sub-group on M&E as part of the standard ARC model;
    b. defining standards for, and providing guidance on, DRM M&E;
    c. ensuring adequate resources for M&E are budgeted as part of FIPs;
    d. providing advice, experience sharing and technical assistance to strengthen DRM M&E; and
    e. reviewing the M&E arrangements as part of ARC review of FIPs (e.g. against the standards and guidance).

3. Review the Process Audit Guidelines and general ToR for process evaluations of ARC payouts and the specific issues to be addressed in each case, focusing in particular on:
    a. the scope, priorities, and appropriate level of resourcing for process evaluations;
    b. the effectiveness of targeting;
    c. obtaining information from non-beneficiaries as well as beneficiaries;
    d. improving the documentation of the process evaluation approach, especially around sampling;
    e. strengthening the analysis of costs and undertaking cost effectiveness analysis; and
    f. ensuring effective coordination with other M&E and data collection processes.

Recommendations to GoS

The GoS should:

1. Establish clear, evidence-based, guidance on the appropriate support packages required for different profiles of household (including households of different sizes), including a policy on the appropriate conditions for providing food, cash, or other forms of support.

2. Strengthen the M&E system for disaster response specifically to ensure that: (a) it can be determined whether assistance is actually reaching the intended beneficiaries; (b) reliable estimates of the results achieved can be made; (c) any differences in results and access to support relating to gender or for socially disadvantaged groups can be identified; and (d) lessons can be learned for the future.

3. Clarify the relationship, and strengthen integration and coordination, between disaster response and the developing social protection systems, including strengthening the reliability and updating processes for the RNU database, as part of a more comprehensive approach to effective targeting of support.

Recommendations for the remainder of the ARC Evaluation

1. OPM will review the evaluation questions for the remainder of the evaluation in consultation with FCDO, ARC Group, and the ARC Evaluation Reference Group and where necessary revise these to ensure the evaluation produces the most relevant evidence, taking into account the issues identified in section 7.1.5 and other issues identified by stakeholders.

2. OPM will work with the ARC Group to review the ARC Theory of Change, specifically to incorporate ARC Replica, but also to ensure there is fully shared ownership and understanding of the Theory of Change.

3. OPM will review the evaluation design outlined in the inception report in response to the above. An outline of the priority evaluation questions for the second formative evaluation and the approach to addressing them will be developed first. The work undertaken during the second formative evaluation, including revisiting the TOC, will then be used to revisit the design of the remaining ARC evaluations. This will consider any suggested changes to the structure of country case studies and other evaluation research activities (for instance thematic studies on particular issues). This will be discussed and agreed with FCDO, ARC Group and the Evaluation Steering Group as the basis for the remainder of the evaluation.

4. Appropriate national level evaluation governance arrangements should be put in place for each country case study as early as possible in order to ensure effective national government engagement.

5. Given the profile of countries in which ARC operates, OPM will strengthen its core evaluation team’s capacity to work effectively in francophone contexts.

6. The approach and instruments used to assess DRM capacity development and ARC Agency's contribution to it in the Senegal pilot should be used as the basis for one

workstream of future country case studies, though a more formalised classification of the elements of DRM capacity should be developed in line with research evidence.

7. The approach to the assessment of ARC's contribution to finance should be revised to focus more explicitly on the assessment of financial needs and how far ARC has contributed to meeting them.

8. Where country case studies are taking place at the time of a payout, there should be close coordination between the design of the Process Evaluation and the country case study to ensure complementarity and avoid duplication or overlap.

9. For each country case study, a detailed assessment should be made as part of the design process, of the data and analysis that is available to assess the effects at household level, to determine as part of the design process what evidence relevant to the ARC evaluation may be available and what level of resourcing should be allocated to this workstream. Where possible the Evaluation Team should seek to influence (in coordination with ARC Agency) ongoing or planned data collection processes to improve household level evidence, and to ensure that available data can be accessed for the purpose of the evaluation. This evidence will provide a useful contribution to understanding the effectiveness of government drought responses, but as noted above does not provide evidence of the impact of ARC itself.

List of abbreviations

ACF	Action Contre la Faim (Action Against Hunger)
ACTED	Agence d'Aide à la Cooperation Technique et au Developpement (Aid Agency for Technical Cooperation and Development)
AFD	Agence Française de Développement (French Development Agency)
AGRHYMET	Agrometeorological and Hydrological Centre at CILSS
ARC	African Risk Capacity
ARV	Africa RiskView
AfDB	African Development Bank
ANSD	Agence Nationale de la Statistique et de la Démographie (National Statistical and Demographic Agency)
BOAD	La Banque ouest-africaine de développement (West African Development Bank)
CERF	United Nation Central Emergency Response Fund
CFA	CFA Franc
CH	Cadre Harmonisé (Harmonised Framework)
CILSS	Comité permanent inter-Etats de lutte contre la sécheresse dans le Sahel (Permanent Interstate Committee for Drought Control in the Sahel)
CLM	Cellule de Lutte contre la Malnutrition (Nutrition Coordination Unit)
CP	Contingency Plan
CNAAS	Compagnie Nationale d'Assurance Agricole du Sénégal (National Agricultural Insurance Company of Senegal)
CSA	Commissariat à la sécurité alimentaire (Food Security Commission)
DAN	Division de l'Alimentation et de la Nutrition (Division of Food and Nutrition)
DFID	UK Department for International Development
DIREL	Direction de l'Elevage (Livestock Directorate)
DGPSN	Délégation Générale à la Protection Sociale et à la Solidarité Nationale (General Delegation for Social Protection and National Solidarity)
DPC	Direction de la Protection Civile (Civil Protection Directorate)

DRM	Disaster risk management
ESG	Evaluation Steering Group
ECHO	European Community Humanitarian Aid Office
EIB	European Investment Bank
ENF	Expected New Funds
EQ	Evaluation question
ESPS	Enquête de Suivi de la Pauvreté au Sénégal (Senegal Poverty Monitoring Survey)
EU	European Union
FAO	United Nations Food and Agriculture Organisation
FCDO	UK Foreign, Commonwealth and Development Office
FIP	Final Implementation Plan
Gavi	Global Alliance for Vaccines and Immunisation
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GIS	Geographic information system
GoS	Government of Senegal
HDDS	Household Dietary Diversity Score
HF	Harmonised Framework (Cadre Harmonisé)
HH	Household
ICT	Information and communication technology
IDA	International Development Association
IITFC	International Islamic Trade Finance Corporation
IM	Independent monitoring
IMF	International Monetary Fund
INT	Intermediate Change
IsDB	Islamic Development Bank
KII	Key Informant Interview
KfW	Kreditanstalt für Wiederaufbau

MCF	MasterCard Foundation
MDCEST	Ministère du Développement Communautaire, de l'Équité Sociale et Territoriale (Ministry of Community Development, Social and Territorial Equity)
MEPA/DIREL	Ministère de l'Elevage et des Productions Animales (Ministry of Livestock and Animal Production)
MFB	Ministre des Finances et du Budget (Ministry of Finance and Budget)
MSAS	Ministère de la Santé et de l'Action Sociale (Ministry of Health and Social Action)
M&E	Monitoring and Evaluation
NGO	Non-governmental organisation
OP	Operational Plan
OPM	Oxford Policy Management
OSB	Opération Sauvetage du Bétail (Operation Livestock Rescue)
PNBSF	Programme National de Bourses de Sécurité Familiale (National Family Welfare Grant Programme)
PNR	Plan National de Riposte (National Response Plan)
RNU	Registre National Unique (Single National Registry)
SECNSA	Secrétariat Exécutif du Conseil National de Sécurité Alimentaire (Executive Secretariat of the National Council of Food Security)
STC	Short Term Change
ToC	Theory of change
ToR	Terms of reference
TSD	Technical Support Department
TWG	Technical Working Group
UNICEF	United Nations Children’s Fund
USDoS	United States Department of State
USAID	United States Agency for International Development
WFP	World Food Programme

1 Introduction

1.1 Overview of the ARC African Risk Capacity evaluation

The African Risk Capacity (ARC) was 'established to help African governments improve their capacities to better plan, prepare, and respond to extreme weather events and natural disasters. Through collaboration and innovative finance, ARC enables countries to strengthen their disaster risk management systems and access rapid and predictable financing when disaster strikes to protect the food security and livelihoods of their vulnerable populations' (ARC, undated). ARC is comprised of ARC Agency, a Specialized Agency of the African Union, and the ARC Insurance Company Limited (ARC Ltd), a financial affiliate that delivers risk transfer services.

In March 2014, the UK Department for International Development (DFID), now the Foreign, Commonwealth and Development Office (FCDO), approved support of up to £100 million over 20 years to launch an African risk insurance pool and early response mechanism, African Risk Capacity (ARC). FCDO's support comprises up to £90 million in development capital (DevCap) to be invested on the basis of need and performance to capitalise ARC Ltd and up to £10 million of grant funding for technical assistance through the ARC Agency, performance reviews and independent evaluation.

The United Kingdom's Foreign, Commonwealth and Development Office (FCDO) has commissioned Oxford Policy Management (OPM) to carry out an Independent Evaluation of ARC over the period from 2015 to 2024, focusing on *ARC's role in enabling a timely response following an extreme climate disaster, such as drought or flooding, before the livelihood situation of affected households becomes critical*.[3]

The evaluation design, as set out in the ARC Evaluation Inception Report (OPM, 2017a), envisaged conducting two formative evaluations, and two rounds of impact studies. The overall impact evaluation approach is based on Contribution Analysis (CA), through collecting a variety of information to test the extent to which the Theory of Change (ToC) is holding, and to develop and test contribution stories to provide a rigorous qualitative assessment of ARC's contribution. The methodology set out in the Inception Report included "impact assessment" defined as a participatory process of collecting evidence about the extent to which the ToC has held at country level.

OPM carried out a first formative evaluation of ARC in 2017 (OPM, 2017b). This highlighted positive contributions that ARC is making to raising awareness and building capacity in relation to disaster risk management (DRM) and risk financing in case study countries. Some problematic areas for ARC were also identified, particularly in its organisational approach to ensuring its sustainability through fostering demand for its insurance product and building a robust risk pool.

OPM was due to undertake a second formative evaluation in 2019, to build on this work and further assess ARC's organisational efficacy. However, this was placed on hold as the risk

[3] One key objective of the evaluation is 'to test if risk pooling and transfer is a cost effective way to incentivise contingency planning and ensure rapid responses to drought and other extreme weather events' (ToR, p. 2).

pool had diminished and ARC was undergoing significant organisational change and is now due to take place in 2021/22. Instead, it was agreed to proceed with carrying out a pilot of the country case study approach for the impact phase of the evaluation.

1.2 The Senegal pilot

Senegal was selected for the pilot because drought in 2019 triggered insurance payments from ARC both to the Government of Senegal (GoS) and to the Start Network[4] of non-government organisations (NGOs) (under ARC Replica). These payments were made in December 2019 'to cover losses from crop failures caused by the severe rainfall deficits in the 2019 agricultural season' (ARC, 2019). The payout has provided an opportunity to assess ARC's effects as it relates to alleviating the loss of assets and livelihoods for vulnerable households in the event of a natural disaster in Senegal, as well as the wider capacity-building support that ARC has provided to GoS to manage its weather-related shocks and risk.

The fact that Senegal had previously received an ARC payout in response to drought in 2014 also allowed a comparison to be made of the use made of ARC support, and the extent to which national DRM capacity had developed between the two droughts, as well as an assessment of the extent to which ARC support may have contributed to any improvements.

The case study for Senegal was conceived as a *pilot* as it involved testing an approach and a set of tools for assessing the effects for one country of engagement with ARC, with a view to informing the approach for further country-level studies as part of the ARC evaluation.

An initial draft evaluation plan for the Senegal country study was prepared in January 2020. This, based on the evaluation framework developed in the evaluation inception report, proposed three workstreams: the first two examining ARC's role in providing finance and DRM capacity development, respectively; and the third (the core of the participatory impact assessment) being a process evaluation of the drought response. As discussed in section 3.5, the approach was modified to take account of the fact that ARC Agency was commissioning a separate process evaluation exercise and the third workstream was revised to comprise an exploratory quantitative analysis (using secondary data sources) of the impact of assistance provided to households. The final design for the pilot country case study was set out in OPM (2020).

1.3 Impact of COVID-19 and changes from the evaluation plan

It had been planned to begin the study with a scoping mission, to take place in March 2020. However, the emerging COVID-19 pandemic profoundly affected the planned drought relief support, as set out in the Final Implementation Plans (FIPs) prepared by GoS and the Start Network. As described in Chapter 2, the GoS prepared a revised *Plan National de Riposte* (PNR, National Response Plan) in February 2020, which incorporated the ARC drought relief funding within a much larger programme to address the economic impact of COVID-19. The Start Network continued to implement its FIP, but movement and contact restrictions led to

[4] The network comprises six NGOs (Catholic Relief Services, Action Contre la Faim (ACF, Action Against Hunger), Oxfam, Plan International, World Vision, and Save the Children).

delays and posed challenges for planned data collection, as well as the delivery of aid to households.

The impact of COVID-19 did not prevent the core of the proposed methodology being implemented as intended or evidence being collected to address the evaluation questions. The main changes from the approach envisaged in the evaluation plan (OPM, 2020) have been the following:

- The fact that the drought had been overtaken by an adverse shock estimated to have much larger adverse economic consequences, and that the GoS FIP would not be implemented as planned, affected in some ways the extent to which the impact of ARC's support on Senegal's drought response could be assessed through this study – in particular the quantitative analysis undertaken was of the response to the combined drought and COVID-19 impact and it is not possible to draw conclusions about the drought response alone. However, it also allowed an assessment to be made of potential ARC's contributions to Senegal's capacity to address a larger and more complex adverse shock.
- The study was undertaken without international travel, with the UK-based team collaborating with team members based in Senegal who have carried out key informant interviews (KIIs) and obtaining access to data and documentation.
- It was originally anticipated that three separate reports covering each of the three workstreams (finance, capacity, household impact) would be prepared along with a separate synthesis report. It became clear that the amount of evidence did not justify producing separate reports for workstreams one and two, and the evaluation team decided to integrate the evidence into a single synthesis report, with additional technical material from workstream three included in annexes.
- As discussed in Section 3.5.3, issues related to the availability of data required changes to the proposed approach for assessing household impact.
- The original formulation of some of the evaluation questions (EQs) was refined and consolidated to reflect the nature of the evidence available (see Section 3.4).

1.4 Report structure

The remainder of this report is structured as follows. Chapter 2 describes the context of poverty and drought vulnerability in Senegal, and ARC's role since 2014, and it provides a summary overview of the 2019 drought and 2020 COVID-19 crisis in Senegal, as well as the main features of the response. Chapter 3 describes the methodology of the study. The findings of the study (in the form of answers to the EQs) are presented in the following chapters. Chapter 4 contains the findings on the financing of drought response and Chapter 5 contains the findings on DRM capacity (including a comparison of the response to the 2014 drought and the 2019/20 crises). Chapter 6 provides a summary of the findings from the quantitative analysis of household effects. Chapter 7 presents the conclusions, lessons, and recommendations from the study, including the implications for country studies to be carried out through the rest of the ARC evaluation.

Additional information is provided in the following annexes. Annex A provides a list of key informants interviewed for the study. Annex B sets out the EQs for the study and their

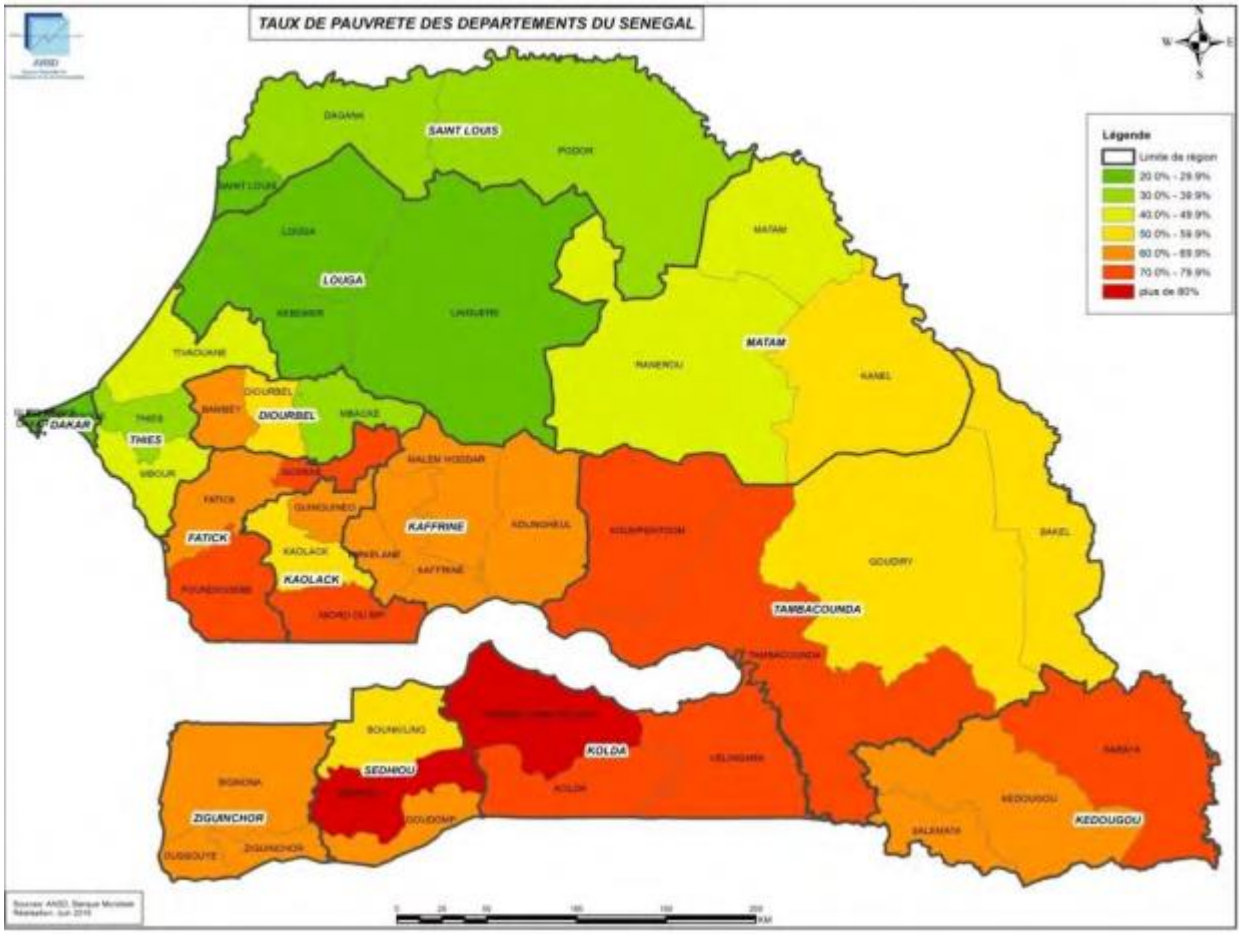
relationship to the wider ARC evaluation framework. Annex C summarises information about poverty in Senegal. Annex D provides information on Senegalese participation in ARC capacity-building activities. Annex E reproduces the recommendations from the Kimetrica Process Evaluation. Annex F presents the needs assessment from the GoS FIP. Annex G reviews the RNU. Annex H describes and assesses the data sources (from Kimetrica and the Start Network) that have been used to estimate the household effects of the aid provided. Annex I contains the full quantitative assessment of household effects.

2 Overview: ARC, Senegal, and the 2019/20 crisis

2.1 The national context: poverty and drought in Senegal

Senegal is among Africa's most politically stable countries, with three major peaceful transitions since independence in 1960, and Senegal's economic growth was among the highest in Africa between 2014 and 2018, standing at 5.3% in 2019 (down from 6.3% in 2017) (World Bank, undated). However, according to a poverty assessment by the World Bank in 2015, the national poverty rate in Senegal has remained high (see Annex C for more information on poverty calculations), showing only a moderate rate of decline from 55.2% in 2001 to 46.7% in 2011 (World Bank and *Agence Nationale de la Statistique et de la Démographie* (ANSD), 2016). Large regional disparities exist, with poverty rates increasing from north to south (with the notable exception of Dakar).

Figure 1: Senegal poverty map: poverty rates at the department level



Source: World Bank and ANSD (2016)

The spatial pattern of poverty in Senegal (Figure 1) can be explained by factors such as the lack of market access and connectivity in the more isolated regions to the east and south. As a Sahelian country, Senegal faces a critical constraint, inadequate and unreliable rainfall,

which limits the opportunities in the rural economy, in which the majority of the population are active (World Bank and ANSD, 2016). Senegalese agriculture is mainly rainfed and agriculture is the sector that is most vulnerable to drought. There is only one cropping season (May–October) for this rainfed agriculture.

Senegal is divided into 14 regions, each of which is divided into one to four departments. The second highest-level departments are further split into either a commune (rural or urban area), arrondissement (rural area), or ville (urban area). The latest household consumption expenditure survey was implemented in 2011 (*Enquête de Suivi de la Pauvreté au Sénégal* (ESPS-II) (ANSD, 2019) and provides information on household well-being, consumption expenditure, employment, housing, education, health, and other socioeconomic indicators. Poverty indicators are produced at the national and regional levels and they are unable to capture important differences between different geographical spaces, such as departments or communes. Regions vary widely in the incidence of poverty. Poverty incidence is highest in the south, especially Casamance, which incorporates the regions of Ziguinchor, Kolda, Sedhiou, and Kedougou. There is also considerable heterogeneity in the poverty headcount rate even within regions and departments (World Bank and ANSD, 2016).

Nevertheless, based on the latest poverty and equity brief by the World Bank (World Bank, 2020), the proportion of people living below the US$ 1.9 purchasing power parity (PPP) 2011 threshold has gradually been declining, from 38% in 2011 to 32.9% in 2019. Poverty rates were expected to increase in 2020 due to the economic impact of COVID-19, with the decline only expected to resume in 2021. Despite this overall favourable trend in poverty rates it can be calculated that in 2019 460,000 poor people were added to the estimated 5 million poor people in 2011, due to rapid population growth, which has outpaced per capita income growth.

2.2 ARC and Senegal

Senegal was one of the first pool of African Union members to take out insurance through ARC. Senegal has paid an annual insurance premium of CFA franc (CFA) 1.8 billion (about US$ 3.1 million) since 2014, with the cost being met from the government budget, although the premium was not paid in 2018 (ultimately being deducted from the 2019 payment), and no premium was paid for 2020. ARC reached an agreement with GoS to participate in the 2018 ARC Replica initiative with Senegal being in the first group of countries to do this along with Mali and Mauritania (where WFP is the Replica partner). This initiative allows NGOs and international organisations to receive the support of replicated insurance policies that are purchased by ARC member states as a Replica partner. In Senegal the Replica partner is the Start Network, which comprises six international NGOs operating in the country. NGO donors financed the first premium payment under this arrangement in 2019.

Insurance payments to Senegal under ARC have been triggered twice, in respect of droughts during the 2014 and 2019 crop seasons. In 2015 an insurance payment of US$ 16.5 million was made to GoS,. In December 2019, payouts were triggered under the insurance policies held by both GoS and the Replica partner (the Start Network) amounting to US$ 12.5 million[5] to GoS and US$ 10.6 million to the Start Network, for a total payout of US$ 23.1 million.

[5] US$ 3 million was retained in respect of the insurance premium due for 2018.

In addition to the premium and insurance payments, ARC's engagement with Senegal has involved the establishment of a permanent GoS Technical Working Group (TWG). This works through sub-groups (to which ARC Agency has provided technical support), which are responsible for: (i) operational planning, including the preparation and biennial update of an operational plan, which is intended to form the basis of the FIP in the event that a drought insurance payment is triggered; (ii) risk modelling and early warning; and (iii) risk transfer, covering budgeting payment of the ARC insurance premium, concluding insurance cover, and making ARC funds available to the implementing agencies once ARC Ltd makes the insurance payout. With the establishment of ARC Replica, representatives of the Start Network have also participated in the TWG, with coordinated operational plans being developed for both GoS (under ARC) and the Start Network (under ARC Replica).

The key GoS organisations involved the management and implementation of ARC funded activities are shown in Table 1.

Table 1: GoS organisations involved in ARC funded activities

Agency	Role
Executive Secretariat of the National Council of Food Security (SECNSA)	• Targeting operations • Beneficiary list verification • Oversight of cash and food distributions • M&E Communications
Food Security Commission (CSA)	• Food procurement and delivery
General Delegation for Social Protection and National Solidarity (DGPSN)	• Provide beneficiary lists for intervention targeting
Directorate of Civil Protection (DPC)	• Coordinate social protection policy aspects of interventions • Support targeting
Unit to Combat Malnutrition (CLM)	• Coordinate nutrition interventions • Monitor nutrition activities through CLM Regional Offices (BER)
Ministry of Health and Social Action (MSAS)	• Coordinate nutrition interventions through the Food and Nutrition Division (DAN) • Monitor nutrition activities through local health facilities
Ministry of Livestock and Animal Production (MEPA)	• Monitor and coordinate CDSA and CRSA procurement and sale of subsidised animal feed through the Livestock Directorate (DIREL)
Ministry of Economy, Finance and Planning (MEFP)	• Open the special bank account intended to house ARC funds • Appoint a funds manager to monitor and manage the bank account
Rural Commission (CRSA)	• Procurement and sale of subsidised animal feed (in collaboration with MEPA and CDSA)
Departmental Commission (CDSA)	• Monitor financial flows and the effectiveness of sales in relation to feed factories and the CNCAS bank • Procurement and sale of subsidised animal feed (in collaboration with MEPA and CRSA)

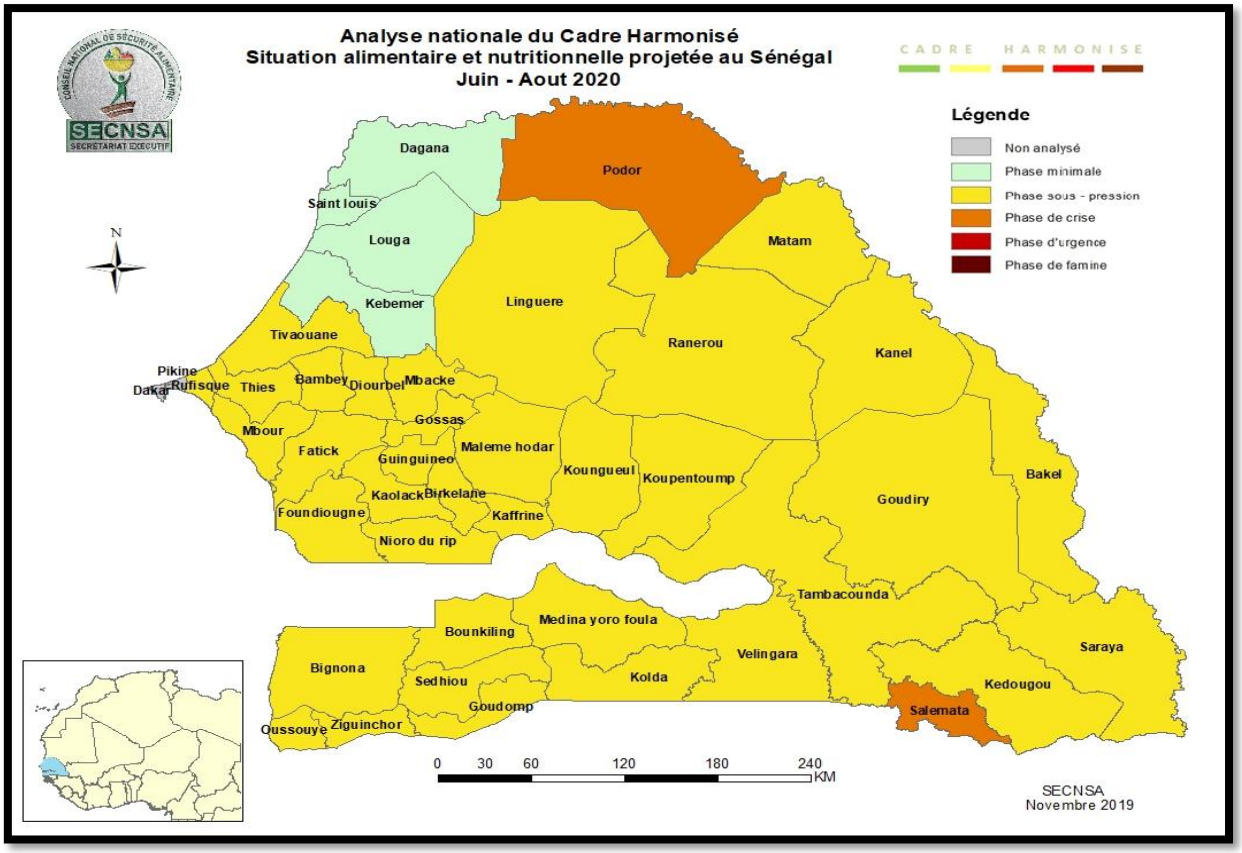
Source: Kimetrica Process Evaluation, p. 14

2.3 Onset of drought in 2019

2.3.1 Drought projections

The 2019/20 crop year gave rise to serious concerns due to the very late rainfall in the agricultural and livestock production areas in the north and centre of the country. The ARC early warning system and needs assessment exercises forecasted that the following regions would be most severely affected: Diourbel, Kaffrine, Kaolack, Dakar, Thies, Fatick, St. Louis, Louga, Matam, Tambacounda, Sedhiou, Ziguinchor, and Bignona. The situation was compounded by the precarious food situation and a deterioration in the nutritional status of children. Figure 2 shows the food security and nutrition situation projected in November 2019 for June to August 2020.

Figure 2: Assessment of projected food security impact of 2019 drought



Source: SECNSA (2019) reproduced in Kimetrica (2020)

While comprehensive data on the impact of the 2019 drought on agricultural production and livelihoods is not available, the household survey carried out for the Kimetrica process evaluation concluded (p. 12) that:

> "The 2019 drought resulted in significant reductions in household agricultural production, limiting access to food during the lean season and making households depend on markets for buying food sooner than usual. In the agro-pastoral zones, where livestock rearing is a major source of income and food, the fodder deficits grew and body conditions and livestock value deteriorated due to difficult access to pastures, eroding the income base of pastoral households. When asked about the

severity of the drought, more than half of survey respondents described the 2019 drought either as “severe” or the “worst remembered.””

2.3.2 Final Implementation Plans

The FIPs created by GoS and the Start Network articulated how the insurance payout would be distributed to support the response effort. Activities planned in the GoS FIP included rice distribution to 148,866 people in 18,661 households (each household would receive 45 kg of rice distributed over the course of three months, amounting to 7,000 tonnes of rice); supplementary feeding for more than two million children under five, and pregnant and lactating women (provision of enriched flour); and the provision of 10,810 tonnes of subsidised livestock feed (to support 370,567 tropical livestock units) to herd owners at sites in transhumance areas.[6]

Start Network planned activities included a cash transfer (selected households would receive CFA 5,000 per household member up to a maximum of CFA 40,000 for a household of eight people); supplementary feeding for children under five and pregnant and lactating women (enriched flour); and a nutrition awareness programme (with sessions to be held to help teach people about nutrition and hygiene, aimed at bringing about behavioural changes).[7] The Start Network FIP aimed to reach 25,000 households (approximately 203,000 people).

2.4 The impact of COVID-19 and the revised PNR

During the targeting and implementation period of the planned interventions, the country faced an additional threat from the COVID-19 pandemic. The first COVID-19 case was confirmed in Senegal on 2 March 2020, which led to GoS declaring a state of emergency on 23 March and to the implementation restrictive health and social measures (Kimetrica, 2020). Movement restrictions and market closures, job losses, and reductions in income as a result of the pandemic exacerbated the food insecurity problem, in addition to the expected impact of the 2019 drought. The combined impact of the drought and the pandemic resulted in significant reductions in income, difficulties in getting food, and loss of employment opportunities.

As a result, GoS decided to merge the ARC payout with the GoS COVID-19 response plan as a single PNR, while the Start Network implemented its FIP (ultimately reaching more than 220,000 people as favourable exchange rates enabled more support than originally planned to be provided) in coordination with the GoS support. SECNSA was in charge of coordinating response plans related both to ARC-funded interventions and COVID-19 response measures (ARC National Coordinator, 2020).

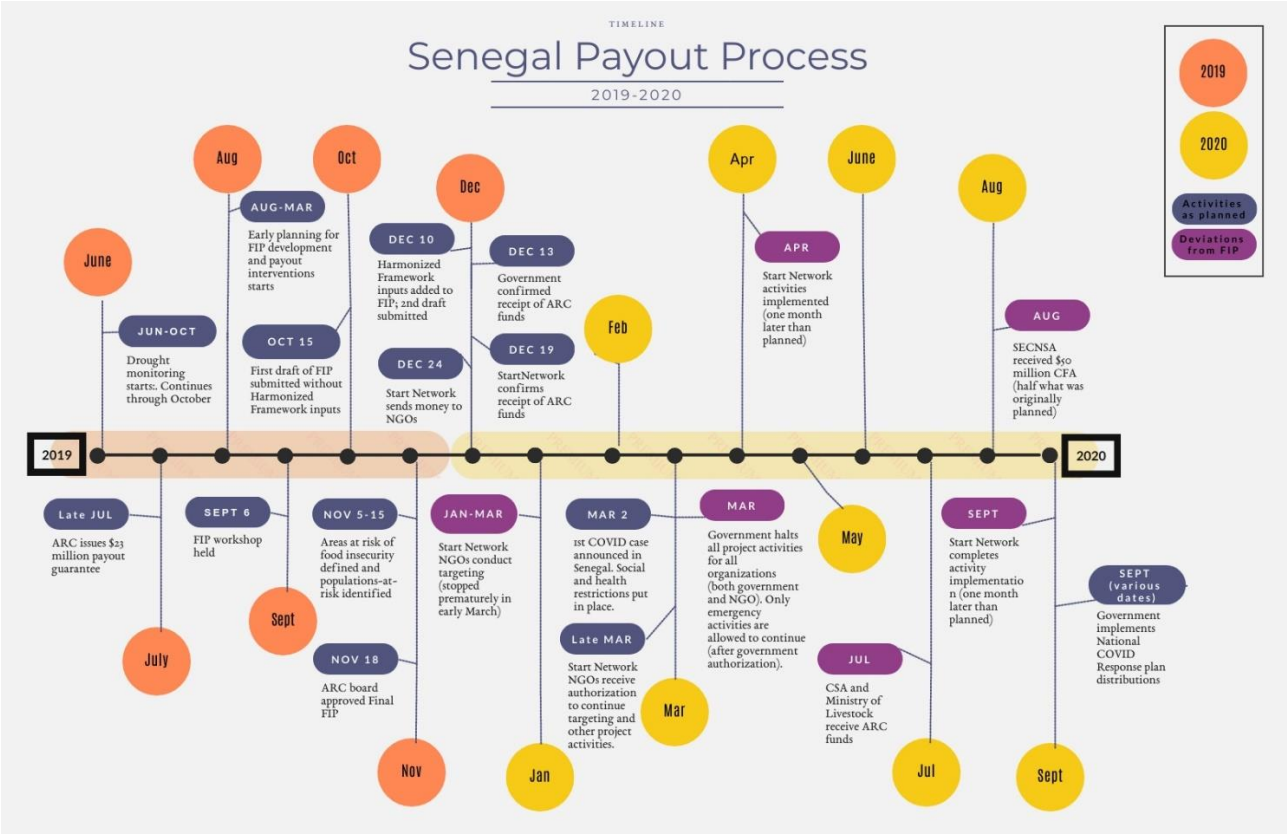
At the end of April 2020, GoS launched a large-scale operation to support 1 million vulnerable households, or nearly 8 to 10 million people out of a population of 16 million (that is, around thirty times the number who had been identified as requiring support as affected by drought), with a food kit consisting of five products for each targeted households. An additional 100,000 households were added to cover refugees and people living with

[6] As regards feed distribution, no household was targeted; GoS gave the product to the breeders association and only breeders with an up-to-date membership card benefited from the distribution

[7] Kimetrica (2020) ‘Draft Final Report: ARC Senegal Payout Process Audit’.

disabilities. A total of 110,000 tonnes of rice were procured and shipped to 552 municipalities in all 45 departments of the country. Details of the implementation by GoS and Start Network are provided in section 5.3, and a timeline of the process is shown in Figure 3.

Figure 3: Timeline of ARC Senegal payout process



Source: Kimetrica Process Evaluation p. 19

The GoS report on the implementation of the FIP (GoS and ARC 2020) noted that funds were released to the Livestock Directorate (DIREL) in February 2020, to SECNSA in July 2020, and for nutritional activities to CLM/DAN in November 2020. The report also notes that the scale of the food distribution undertaken in line with the PMO (with 964,476 households receiving the food package) was unprecedented in Senegal and was successfully implemented despite some organisational and logistic problems and that distribution to the households identified as in the FIP was completed by July 2020. The selection of additional households was based initially on the RNU but extended to include additional households identified by village and local assemblies under the supervision of the administrative authorities. Distribution of livestock feed was completed between June and August 2020. However, the late release of funding for nutritional activities meant that these were expected to take place until the end of the first quarter of 2021.

3 Approach and methodology for the study

3.1 Overview

This chapter describes the approach and methodology used for the impact assessment pilot. Section 3.2 describes the objectives, scope, and audience for the study, and the process of engagement with stakeholders, including the governance arrangements. Section 3.3 summarises the ARC theory of change (ToC) as it has been developed for the ARC evaluation, and the elements of this (causal links and assumptions) for which this study seeks to provide evidence. Section 3.4 sets out the EQs and how these have been derived from the overall ARC evaluation framework. Section 3.5 presents the study methodology for each of the three components (financing, capacity, and household impact). Section 3.6 describes the ethics and safeguarding approach. Section 3.7 discusses the quality and limitations of the evidence obtained.

3.2 Objectives, scope, and audience

3.2.1 Objectives

As part of the long-term evaluation of ARC by OPM, the objectives of the Senegal impact assessment pilot are:

1. to assess how far the provision of payments through ARC has contributed to reducing the loss of assets and livelihoods, and to protecting food security, for households in Senegal that are vulnerable as a result of rainfall deficit;
2. to assess how far ARC has contributed to strengthening the capacity of GoS to manage weather-related shocks, and to improving the availability of finance;
3. to identify lessons for ARC's future operations; and
4. to develop and test approaches for the future evaluation of ARC operations.

The evidence collected has been used to inform the developing contribution analysis for the evaluation (summarised in Table 11).

3.2.2 Scope and timing

The scope of the study incorporates assessment of the results of both the ARC and ARC Replica payments[8] (to GoS and the Start Network, respectively) made in December 2019, as well as the totality of ARC's engagement in Senegal, and particularly comparing the experience of the ARC payments in 2014/15 with those in 2019/20. Some comparisons have also been made between the performance of GoS and the Start Network in managing and

[8] The original design envisaged focusing principally on the ARC payment to GoS. However, given that considerably more extensive information is available on the results of the Start Network's use of resources than GoS's, the scope of the study has been extended to cover both payments.

using the payments where useful lessons can be derived, though it is noted that the GoS and Start Network activities are intended to be complementary. As noted, in the analysis at household level it is not possible to isolate either the food security impact of the rainfall deficit or the contribution of ARC funding to reducing this impact, from the impact of COVID-19 and the response to it.

The study has sought to be complementary to other data collection: specifically, the Start Network's monitoring and evaluation (M&E) and the process evaluation conducted on behalf of ARC by Kimetrica, noting that complementarities were also constrained by differing organisational objectives, contractual mandates, and budgetary scope.

Since the main focus has been to use secondary evidence to assess the impact of the ARC-funded aid effort, and to compare the experience of the response to the 2019/20 drought to that of 2014/15 (including using primary evidence principally from KIIs), the appropriate timing for the study was after the response was completed, so that it has been possible to reflect on lessons from the experience and draw on a full range of secondary data sources.

3.2.3 Audience and stakeholders

As part of the ARC evaluation, this study is addressed to ARC stakeholders. In relation to Senegal, the audience includes GoS (particularly those agencies with responsibility for DRM), the Start Network and its member organisations, civil society, and international agencies and donor organisations with an interest in DRM in Senegal. The findings from the study will inform both the remainder of the ARC evaluation and provide lessons for ARC and other stakeholders in the next phase of ARC's operations.

An earlier draft of this report was shared for comment (including in a French translation) with FCDO, ARC Agency, the GoS, Kimetrica and the Start Network. This draft takes account of comments received and will be submitted to the Evaluation Steering Group (ESG) for review, and will be finalised in response to comments received. Appropriate approaches to the dissemination of the findings will be agreed with ARC and FCDO. It is anticipated that the findings of this report will be used by ARC and GoS to learn lessons to inform ARC's continued operations, and future drought response in Senegal and elsewhere in the region. As a pilot country study for the impact phase of the evaluation, lessons from the study will inform the remainder of the ARC independent evaluation, as discussed in Section 7.1.4.

3.3 Theory of change

ARC's overall ToC was elaborated in the ARC evaluation Inception Report is summarised in Figure 4 (OPM, 2017a). The ToC identifies three 'impact pathways':

1. supporting timely and effective response (for vulnerable households);
2. influencing the policy and practice of member states; and
3. creating increasing value / demand for ARC products and services.

This study focuses principally on the first two of these pathways: the extent to which ARC engagement has contributed first to a timely and effective response for vulnerable households, and second to improving Senegal's policy and practice for DRM. The study does not focus directly on the third impact pathway, though it is assumed that this pathway may be

influenced by the results of GoS's response to drought, and to its management of the ARC payout.

More specifically, within **Pathway 1**, this study provides evidence on the following short-term, intermediate, and long-term changes (STCs, INTs, and LTC, respectively):

- **STC1:** improved government understanding and technical capacity;
- **STC2:** contingency plans (CPs) and insurance contracts in place;
- **INT1:** effective and timely implementation of CPs;
- **INT2:** vulnerable households covered by ARC insurance reduce their loss of assets and livelihoods in the event of a natural disaster; and
- **LTC1:** African Union member countries [Senegal] are better able to anticipate, plan, finance, and respond to climate-related disasters in a timely, effective manner.

Within **Pathway 2**, the study provides evidence on:

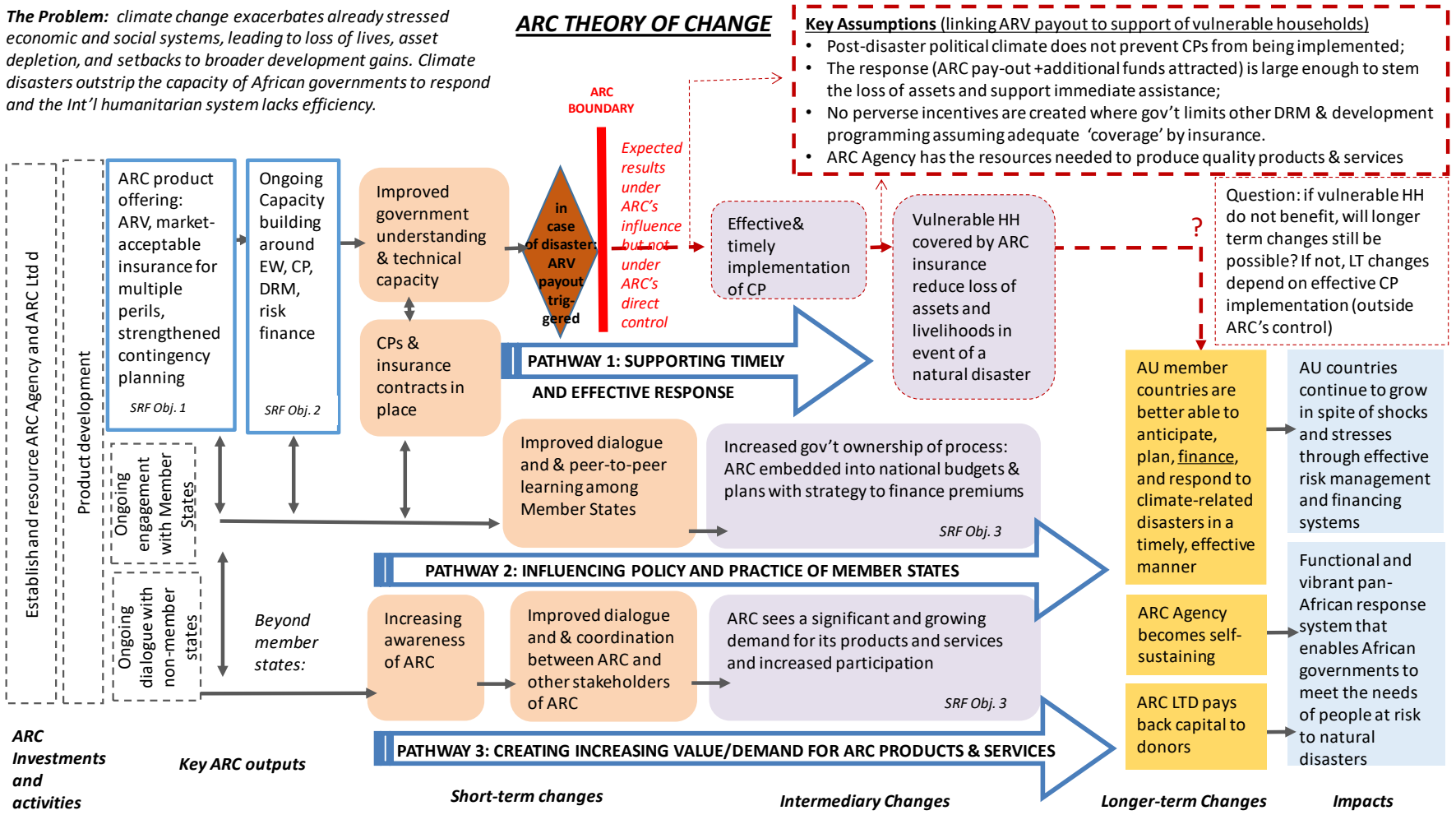
- **STC3:** improved dialogue and peer-to-peer learning; and
- **INT3:** increased government ownership of process: ARC is embedded in national budgets and plans, with a strategy to finance premiums.

This study does not collect evidence at the level of 'impact' in ARC's ToC, since this occurs within a much more long-term timeframe of sustained state-level resilience to large-scale shocks. Rather, the household- and community-level change that the study addresses (Objective 3, to identify lessons for ARC's future operations) is identified as an 'intermediate change' (INT2), in which *vulnerable households covered by ARC insurance reduce their loss of assets and livelihoods in the event of a natural disaster*.

Similarly, the first two objectives of the study coincide with the second pathway and the short-term change (STC3) of *improved dialogue and peer-to-peer learning within Senegal*, and the intermediate change (INT3) of *increased government ownership of process: ARC is embedded in national budgets and plans, with a strategy to finance premiums*.

The evidence emerging from the study in relation to the validity of the ARC ToC is presented in Section 7.1.3.

Figure 4: ARC Theory of change



3.4 Evaluation questions

A total of four overarching EQs were identified for ARC's long-term evaluation. This study provides evidence related to two of these overarching EQs, one for each of the two impact pathways within the evaluation's remit, with the formulation adapted to be specific to Senegal.[9]

- **EQ2 Pathway 1:** To what extent has ARC contributed in Senegal to timely and effective responses that protect affected households' livelihoods and prevent asset loss and food insecurity?
- **EQ3 Pathway 2:** To what extent has ARC influenced Senegal's capacity to anticipate, plan, finance, and respond to climate-related disasters generally, and more specifically to making best use of ARC?

As shown in Annex B, for each of these EQs, more detailed 'general summary questions' were prepared in the ARC evaluation inception report. These have been adapted to provide 'questions for the Senegal impact assessment'. 'Detailed EQs' were then formulated as the basis for obtaining evidence to answer the 'questions for the Senegal impact assessment'. Annex B also shows the sources of information used to answer the EQs, including the ARC process evaluation[10], as well as the three components of this study (reviews of finance and capacity, and the econometric estimation of household impact). One feature of the evaluation approach that is reflected in the EQs is making an explicit comparison between the response to the 2014 drought and the response to the 2019 drought, with a view to determining to what extent DRM capacity may have strengthened over this period, and to assess to what extent ARC may have contributed to any improvement.

For Pathway 1, the EQs originally envisaged for the study were the following:[11]

- What has been the aggregate level of funding available to respond to the 2019 drought? How has ARC's involvement contributed to this, directly and indirectly? [F]
- To what extent have Senegal's CPs been implemented effectively? What factors have influenced the effectiveness of CP implementation? [PE]
- What lessons emerge from Senegal's experience in both 2014 and 2019 for ARC and for GoS? [F, C, PE]
- To what extent and how have payouts to government and the implementation of ARC CPs contributed to the protection of livelihoods and food security, and prevented asset loss in Senegal? [EHI]

[9] Q1 relates to ARC's organisational context, while Q4 relates to the third pathway, neither of which are directly relevant to this impact assessment.
[10] This evaluation framework was shared with the Kimetrica team to ensure that these questions were included in the design of the ARC process evaluation.
[11] In square brackets is shown the component of the study contributing evidence to answer the EQ: F for financing, C for capacity development, EHI for econometric analysis of household impact, and PE for the Kimetrica process evaluation.

- To what extent and how has ARC support contributed to protecting Senegal's macroeconomic performance?[12] [F]

For Pathway 2, the original EQs were:

- To what extent and how has Senegal's capacity (institutional, organisational, and individual) to anticipate, plan, finance, and respond to climate-related disasters changed since the 2014 drought? [C, PE]
- What factors have influenced these changes in capacity? [C]
- How has ARC contributed to changes in capacity? [C]
- To what extent and how did improvements in capacity contribute to a more effective response to the 2019 drought? [C]
- How effectively have stakeholders in Senegal worked together for DRM, and how has this changed since 2014? [C, PE]
- To what extent and how has ARC contributed to building stakeholder commitment and effective cooperation in DRM? [C]
- To what extent and how has ARC engagement with Senegal contributed to commitments of staff and other resources, and time, to DRM? [F]

Some of these EQs have been consolidated for clarity of presentation, so the final set of EQs for which evidence is presented is the following:

In relation to the finance workstream of the evaluation:

- What has been the aggregate level of funding available to respond to the 2019 drought and the subsequent COVID-19 crisis? How has ARC contributed to this?
- What resources have been budgeted and used for DRM in Senegal, and how has this changed over time?
- To what extent and how has ARC support contributed to protecting Senegal's macroeconomic performance?

In relation to the capacity development workstream:

- To what extent and how has Senegal's capacity (institutional, organisational, and individual) to anticipate, plan, finance, and respond to climate-related disasters changed since Senegal joined ARC? How has ARC contributed to this?
- To what extent and how have improvements in capacity contributed to a more effective response to drought?
- To what extent and how has ARC contributed to building stakeholder commitment and effective cooperation in DRM?

In relation to the household impact workstream, the overarching question of 'To what extent and how have payouts to government and the implementation of ARC CPs contributed to the protection

[12] Some analysis was undertaken of this issue showing that the level of ARC support was too small to have a macroeconomic impact. Since it is not the intention of the ARC payments to provide macroeconomic support, this EQ should be removed from the evaluation framework.

of livelihoods and food security, and prevented asset loss, in Senegal?' has been addressed through obtaining evidence on three research questions:

1. Who benefitted from the distributions and how does this vary across different types of households?
2. To what extent have the distributions supported the livelihoods of the households? How well did the support match the needs?
3. Are households able to smooth their consumption as a result of the support received? To what extent do the distributions sufficiently help sustain the respondents' livelihoods?

3.5 Methodology for the study

In line with the ARC evaluation design (as set out in the ARC Evaluation Inception Report), the approach for the study is **theory-based**, in that it focuses on testing the ToC underlying the ARC model – in this case, as it has been implemented in Senegal. The impact evaluation approach for the ARC evaluation is based on a contribution analysis[13] which will be developed from the evidence collected across the research activities conducted for the ARC evaluation as a whol. A summary of the evidence from the case study that will be used to inform the overall contribution analysis is presented in Table 11.

As noted above, it was originally envisaged in the ARC Evaluation Inception Report that primary data collection with a qualitative focus would be undertaken from households as part of the pilot Impact Assessment, and that tools for this purpose would be developed in the pilot. However, it became clear during the design of the pilot that significant primary data collection of this type (including quantitative household data collection) was planned to be undertaken as part of the ARC-commissioned Kimetrica Process Evaluation and the Start Network evaluation. It was therefore decided not to undertake additional primary data collection of this kind, but instead it was agreed with ARC and Kimetrica that some additional questions would be included in the Process Evaluation to collect information of relevance to the wider ARC Evaluation. The resources originally intended for the participatory impact assessment have instead been used to undertake exploratory econometric modelling of the effect of support on households.

The study design is structured around three components: financing, capacity development, and econometric modelling of household impact.

3.5.1 Financing component

This component of the study has examined the provision of finance through the ARC and ARC Replica insurance payouts triggered by the 2019 drought, within the framework of the overall financing, from both national and international sources, of the drought response (and the subsequent expanded relief programme to address the economic impact of COVID-19). The component has focused on

- analysis of Senegal's budgetary provisions and expenditure for DRM;

[13] Contribution Analysis (CA) is an approach that fits well with theory-based evaluations, as it involves an in-depth analysis of a theory of change from inputs to outcomes to establish a plausible contribution. The structured but flexible nature of this type of analysis lends itself to the complexities and uncertainties inherent in the ARC programme. Typically, the 'impact statement' of a contribution analysis approach emerges through the creation of a 'contribution story' rather than the result of a measured 'impact'. (ARC Inception Report, p. v).

- analysis of the process by which ARC funding and the CP and FIP were agreed with ARC;
- analysis of other sources of international funding to assist with the drought response;
- assessment of the implications of COVID-19 for financing.

The data sources used have included national budget and expenditure data, documentation on ARC–GoS negotiations and other donor support, and documentation and data on the macroeconomic context. KIIs were undertaken with staff of GoS (at the Ministry of Finance and Budget (MFB) and at key DRM organisations), ARC, and donors and international agencies.

3.5.2 Capacity development component

This component of the study has assessed how far capacity (institutional, organisational, and individual) for DRM has developed in Senegal; how far this capacity development has contributed to a more effective disaster response; and the contribution that ARC has made to any capacity improvements. This assessment has been based on a comparison of the DRM capacity in place in 2014 and during and after the 2019 drought and the COVID-19 pandemic, and an assessment of how effectively this capacity has been used.

The methodology for this component involved the following analysis:

- Comparison of institutional, organisational, and individual capacity for DRM in 2014 and in 2019 based on information obtained from documentation review and KIIs;
- assessment of the direct and indirect influence of ARC on any changes in capacity, including a review of ARC (and other) support provided for DRM; and
- stakeholder analysis of DRM capacity, and of the role of stakeholders in key decisions and processes affecting this capacity and how it has been used.

Data sources have included a review of documentation on the legal and regulatory framework for disaster response, the key organisations involved in DRM, and ARC's capacity development support for DRM. KIIs were carried out with the main stakeholder groups, including GoS ministries and agencies involved in DRM, ARC, donor agencies and international organisations, civil society organisations, and individuals who have received training or other capacity development support. This component has also drawn on findings from the ARC process evaluation.

3.5.3 Methodology for the study of household impact

The original aim of this component of the study, as stated in the evaluation plan, was to assess the effects of the payout received by beneficiary households, by comparing them with non-beneficiary households in the same geographical area. It was intended to use data collected by Kimetrica for the process evaluation, the Start Network evaluation, and other sources of secondary data as available, including the RNU database (which was cited in the FIPs of both GoS and the Start Network as the initial list from which the beneficiaries were drawn). The main hypothesis was that by receiving sufficient support (in cash and in-kind) in a timely manner, beneficiary households would be able to avoid negative impacts on livelihoods and assets.

However, the evaluation team was unable to obtain access to the RNU database as a result of GoS restrictions on sharing data outside the country, and upon reviewing a number of reports which have reviewed the RNU, including Kimetrica's own review of the RNU as part of their

sampling, it became clear that there were also many discrepancies and errors in this database.[14] Neither Kimetrica nor the Start Network had planned to collect data from non-beneficiary households and there was also no baseline data collected for beneficiary households prior to the distribution. For the GoS intervention, the only household data available was the small sample collected by Kimetrica.

As a result of these data limitations, it was necessary significantly to adjust our analysis and methodology compared to its original ambition. Instead of comparing beneficiary and non-beneficiary households, we were only able to use data on beneficiary households, and our datasets are based on household surveys conducted by Kimetrica (401 households who received both ARC and ARC Replica distributions) and by the Start Network (2,555 households).

We opted for an exploratory approach to our quantitative analyses, which built on the findings reported in the Kimetrica process evaluation and the Start Network payout evaluation, to address three main research questions:

1. Who benefitted from the distributions and how does this vary across different types of households (e.g. male-/female-headed household, household size, sources of support, etc.)?
2. To what extent have the distributions improved the livelihoods of the households?
3. Are households able to smooth their consumption as a result of the support received? In other words, to what extent do the distributions sufficiently help sustain the respondents' livelihoods?[15]

We conducted the analysis with Kimetrica data and the Start Network data separately as it is not possible to merge these two datasets (the two surveys had different purposes, different geographical coverages, and different sampling frames). We produced descriptive statistics on household characteristics and carried out cross-tabulation analysis[16] of these characteristics and the self-reported outcome variables. We also carried out logistic regression to explore the effects of different types and frequencies of distributions on selected self-reported outcome variables, which we use as proxies for household livelihoods, controlling for other household characteristics.[17]

3.6 Ethics, safeguarding, and stakeholder engagement

The evaluation has adhered to international best practice in ethical conduct (including the principle of 'doing no harm'), and has been informed by DFID/FCDO's Ethical Guidance for Research, Evaluation and Monitoring Activities. Most data collection through KIIs has been with government officials and related stakeholders, and has not required formal approval from an ethical review board. No primary data collection from vulnerable community members or children was undertaken, and no reward or compensation structure was provided for participants.

[14] A review of the RNU database is provided in Annex G.
[15] In the event the data available was not sufficient to answer this question, as described in annex section I.3.3.
[16] Cross-tabulation is a quantitative research method that is appropriate for analysing the relationship between two or more variables. Cross-tabulations provide a way of analysing and comparing the results for one or more variables with the results of another (or others).
[17] We chose the logistic regression method as it is well suited to describing and testing hypotheses about the relationships between a categorical outcome variable (which is the nature of our self-reported outcome variables) and one or more categorical predictors/independent variables, which is the structure of both of our datasets. For more details on logistic regression and model selections, see Annex I.3.1.

A two-stage approach was taken in conducting the KIIs, with the first stage serving as a way of piloting the interview instruments used, as well as determining that the burden of data collection was not excessive. Protocols for ensuring privacy and confidentiality for interviewees (and securing informed verbal consent) were developed and followed. The data collected (including interview transcripts) are being maintained on a secure server. Any quotes from KIIs used in the report have been anonymised.

The study team has been able to work freely and without interference, subject to movement constraints resulting from COVID-19. Independence and objectivity has been assured through the triangulation of different data sources, including to reflect a balance of stakeholder interests and to take account of any biases.

The study has been implemented in accordance with the Paris Declaration principles in the following ways. National ownership of the evaluation has been promoted through the establishment of an ESG for the evaluation of ARC (and ARC Replica) payouts in Senegal in relation to the 2019 drought. The purpose of the ESG has been defined as follows:

1. To ensure effective engagement of key stakeholders in the evaluation to maximise the value of the evaluation for stakeholders, to ensure that stakeholder perspectives are represented in the evaluation studies, and to facilitate access to information from stakeholders.
2. To strengthen coordination between the different components of the evaluation (including the evaluation studies being undertaken by Kimetrica, OPM, and the Start Network), including sharing information and avoiding duplication or overlap in data collection.
3. To provide a forum for review and discussion of the evaluation plan and the outputs of the evaluation.
4. To provide expert advice and a critical challenge to the evaluation findings to ensure quality and relevance.

The ESG met to review the OPM evaluation plan (which was translated into French), the Kimetrica inception report, and information on the Start Network evaluation activities, and will also review this draft report. Membership of the EAG has included members from GoS, ARC, DFID/FCDO, other donor agencies, Kimetrica, OPM, and the Start Network.

3.7 Evidence quality and limitations

3.7.1 Evidence on finance and capacity development

Key informants were selected for interview principally based on the suggestions of ARC and the local consultants, and taking account of interviews that had been carried out for the Kimetrica process evaluation.[18] The main limitation of the key informants selected was the restriction to central government and other Dakar-based key informants. This meant that it was not possible to obtain perspectives from (in particular) local governments on the effectiveness of capacity

[18] This meant that representatives of some GoS line ministries and agencies were not separately interviewed for this study, since relevant information had been by the Process Evaluation, including on specific questions for this evaluation which were agreed with Kimetrica and ARC Agency should be included in the Process Evaluation key informant interviews.

development. However, the Kimetrica Process Evaluation and Start Network evaluations did collect information from key informants in different geographical areas on aspects of the effectiveness of aid distribution.

In addition to weaknesses in the availability of data at the household level, as discussed in the next section, the evaluation team has not been able to obtain information on either the actual incidence of drought and how this affected particular areas (beyond the early warning information), nor any comprehensive assessment of the impact of the COVID-19 movement and contact restrictions and other forms of economic disruption. This means it has been difficult to assess the adequacy of the planned responses in relation to the scale and nature of the shocks experienced.

3.7.2 Evidence for assessing impact on households

The Kimetrica process evaluation and the payout evaluation of the Start Network distributions provide valuable data that help to fill gaps in GoS's current M&E system and provide models for ways in which it may be strengthened. They are the only source that allow any assessment about household-level impact to be made. However, not having been designed with a view to carrying out a comprehensive impact evaluation, they have significant limitations, including the following:

- The evaluations do not provide for a before-and-after comparison of the well-being and livelihoods of beneficiary households. They rely instead on retrospective reporting of outcomes by households of either negative outcomes avoided (the process evaluation) or the use of the support received (the Start Network evaluations). Before-and-after comparisons are generally stronger and could measure changes in a range of indicators, including less subjective measures, such as anthropometric status. In the case of the Start Network, pre-intervention data were collected for a large number of households (28,797), which could have provided such a baseline, but these data were reported to be of lower quality and to have problems of comparability with the subsequent surveys. There is clearly an opportunity to make better use of similar surveys in future.

- The evaluations carried out surveys of beneficiaries only, and so they do not provide information on overall coverage, or on how the characteristics of beneficiary households compare with those that were not selected for support, which would be necessary to assess the adequacy of targeting. Nothing is known about outcomes in non-beneficiary households, and thus trends in their well-being are not known, and the actual impact of the intervention cannot be measured (there is no counterfactual). Extending the sample to cover some non-beneficiary households (pre- and post-distribution) would have provided this information.

- Information was not systematically collected to help understand better how households with different livelihood strategies were affected by the drought, by the economic impact of COVID-19, and by the support provided.

- No objective outcome variables are available and, as such, we are only able to rely on self-reported outcomes, which are likely to suffer from recall and social desirability biases, among others.

- There is very little detailed information available on who benefitted, and in what ways, from the animal feed support. There appears to be no information on who benefitted, and by how much, from any writing off of debt under the Calamity Fund.

- There is also no information on how many households received cash instead of flour, and how much they received.

4 Findings: Financing of disaster risk response

4.1 What has been the aggregate level of funding available to respond to the 2019 drought and the subsequent COVID-19 crisis? How has ARC contributed to this?

ARC provided a net total of US$ 20 million in drought response as insurance payments in December 2019. This amounted to the totality of external support received to address the drought (with the exception of some additional support for nutrition activities) and represented 28.9% of the estimated response requirement for a severe drought. However, funding to address the subsequent economic impact of the COVID-19 pandemic (with which drought relief funds were integrated) was on a far greater scale. ARC funding represented about 4% of the total support received by GoS to finance direct emergency relief for vulnerable households in response to the economic impact of COVID-19, with ARC Replica providing a further 4.3%.

The level of external support available to address the effects of the 2019 drought consisted of total ARC funding of US$ 23.0 million, comprising US$ 9.3 million for GoS and US$ 10.7 million for the Start Network (under ARC Replica), as well as US$ 3.0 million for GoS that was retained by ARC to cover a bill for an outstanding premium payment due from 2018. The ARC payout to GoS took place on 13 December 2019, in the amount of CFA 5.91 billion, On the basis of a presidential decree promulgated on 3 February 2020, this was allocated to the activities shown in Table 2. The payment to the Start Network took place on 19 December 2019.

Table 2: GoS allocation of ARC funds by activity

Activity	Amount (CFA bn)	Percentage of total	Agencies involved
Purchase of rice	2.75	47	CSA[19]
Purchase of cattle feed	1.00	17	MEPA/DIREL[20]
Calamity Fund[21]	1.00	17	MFB[22]
Malnutrition	0.45	8	MSAS/DAN[23] and CLM[24]
Targeting	0.05	1	SECNSA
Implementation and supervision	0.66	11	DPC[25]
Total	**5.91**	**100**	

[19] *Commissariat à la sécurité alimentaire* (Food Security Commission).
[20] *Ministère de l'Elevage et des Productions Animales* (Ministry of Livestock and Animal Production).
[21] The Calamity Fund provides disaster relief to borrowing farmers primarily by waiving loans made by the National Agricultural Insurance Company of Senegal (CNAAS). This budget line does not appear in the ARC FIP, and the budget line for purchasing cattle feed has CFA 2.00 billion. World Bank (2013) 'Initial Market Assessment – Country Scoping Note: Senegal', World Bank.
[22] *Ministre des Finances et du Budget*.
[23] *Ministère de la Santé et de l'Action Sociale* (Ministry of Health and Social Action) *Division de l'Alimentation et de la Nutrition* (Division of Food and Nutrition).
[24] *Cellule de Lutte Contre la Malnutrition.*
[25] *Direction de la Protection Civile.*

There was no other large-scale donor support for drought relief. However, key informants reported that the fact that resources from the ARC payout were used for active screening for malnutrition in children under five years of age and to provide financial support for the care of children hospitalised with severe acute malnutrition in certain regions of the country encouraged a modest amount of additional funding from United Nations Children's Fund (UNICEF), World Food Programme (WFP), and ACF, to extend the coverage provided by the Department of Food and Nutrition (DAN) to the entire country, including areas that were not priorities in the FIP, and to expand the range of interventions.[26]

GoS was reorienting its own budget and was considering soliciting additional funds for drought relief when the threat of COVID-19 became apparent. From March 2020 onwards all efforts turned to raising funds to deal with the economic impact of the lockdown imposed in response to COVID-19. These efforts had considerable success. Table 3 shows the pledges of funds that GoS received from international donors for the COVID-19 crisis between April and September 2020. By December 2020, Senegal had received a total of about US$ 1.4 billion.[27]

97% of the pledged direct support consisted of 'expected new funds' (ENF), with the remainder consisting of re-allocated funds. 95% of the funds pledged came from five agencies: the International Monetary Fund (IMF) (US$ 442 million); the World Bank International Development Association (IDA) (US$ 270 million); the International Islamic Trade Finance Corporation/Islamic Development Bank (IITFC/IsDB) (US$ 162 million); African Development Bank (AfDB) (US$ 101 million); and the European Investment Bank (EIB) (US$ 100 million). Chakamba (2020) suggests that GoS may have received more than the sums indicated from these agencies when resources from regional support packages are included.

Table 3: Direct support to Senegal to counter the COVID-19 crisis, Apr–Sep 2020

Donor of covid-19 support to Senegal	$ million equivalent	Date publicised	Source
AfDB / ENF	101.20	30/05/2020	https://www.devex.com/funding/r?report=funding_info-110659
EIB / ENF	100.05	23/07/2020	https://www.devex.com/funding/r?report=funding_info-117094
EU / ENF	6.90	23/07/2020	https://www.devex.com/funding/r?report=funding_info-117094
GAVI / Old funds (RAF)	0.05	19/05/2020	https://www.devex.com/funding/r?report=funding_info-112196
GFATM / Old funds (RAF)	2.07	08/05/2020	https://www.devex.com/funding/r?report=funding_info-109975&filter'
GPE / ENF	7.00	08/07/2020	https://www.devex.com/funding/r?report=funding_info-116138
WB/IDA / ENF	20.00	06/04/2020	https://www.devex.com/funding/r?report=funding_info-105995
WB/IDA / ENF	150.00	12/05/2020	https://www.devex.com/funding/r?report=funding_info-110093
WB/IDA / ENF	50.00	19/06/2020	https://www.devex.com/funding/r?report=funding_info-112666
WB/IDA / ENF	50.00	19/06/2020	https://www.devex.com/funding/r?report=funding_info-112666
(IsDB) / ENF	9.20	10/06/2020	https://www.devex.com/funding/r?report=funding_info-112353
IMF / ENF	442.00	14/04/2020	https://www.devex.com/funding/r?report=funding_info-106269
IITFC/sDB / ENF	162.00	15/04/2020	https://www.devex.com/funding/r?report=funding_info-106329
MCF / ENF	3.39	02/07/2020	https://www.devex.com/funding/r?report=funding_info-115997
United States Department of State (DOS) / ENF	3.90	16/04/2020	https://www.devex.com/funding/r?report=funding_info-106663
United States Department of State (DOS) / ENF	1.90	27/03/2020	https://www.devex.com/funding/r?report=funding_info-104431
BOAD / Old funds (RAF)	13.79	25/09/2020	https://www.devex.com/funding/r?report=funding_info-121318
BOAD / Old funds (RAF)	13.79	25/09/2020	https://www.devex.com/funding/r?report=funding_info-121319
TOTAL	**1137.25**		

Source: Chakamba (2020)

[26] Funding from WFP was CFA 15.4 million. Information was not available on the extent of the support from UNICEF and ACF.

[27] Source: French.China.org.cn (2020) '(COVID-19) Le Sénégal a déjà mobilisé plus de 774 milliards de Francs CFA pour lutter contre le COVID-19 (ministre)', 30 December 2020 [Accessed 16 March 2021].

Of the estimated total direct support of US$ 1,137.25 million (CFA 658 billion)[28] received by October 2020, GoS used CFA 123.6 billion (19%) for its COVID-19 response in 2020.[29] Table 4 shows the composition of the government's budgeted expenditures and the ARC contribution to these budgeted amounts. For each budget line, it also shows ARC's contribution as a percentage of the total budgeted amount for that line. Integrated over the budget items, the ARC contribution to the national response was 4.0% of the total.

Table 4: Budget details for Senegal's PNR, 2020

Budget item	Budgeted amount		ARC contribution	
	CFA bn	% of total	CFA bn	% of total
Emergency food aid	69.0	55.8	2.75	4.0
Cash transfers and food vouchers	46.7	37.8	0.0	0.0
Protecting core livestock	4.9	4.0	1.00	20.4
Actions against malnutrition	1.8	1.5	0.45	25.0
Coordination and M&E	0.1	0.0	0.05	83.3
Other	1.2	1.0	0.66	55.0
Total	**123.6**	**100**	**4.91**	**4.0**

Sources: National Emergency Plan for Food Security (PUSA, 2020) Senegal, April 2020, reproduced in SWAC (2020)

Separately, ARC's payout of US$ 10 million to the Start Network took place on 19 December 2019 to Start Network headquarters, which then allocated it to its six constituent NGOs in accordance with the ARC Replica FIP. This is not included in the 'budgeted amounts' in Table 4 because the Start Network implemented its 2019 FIP largely as developed with GoS and approved by ARC, and thus outside the GoS PNR. Nonetheless ARC's Replica payout should be taken into account in any assessment of the impact on the total budgeted amount for emergency response to Senegal in 2020, increasing the ARC portion of the national response budget by CFA 5.8 billion to CFA 10.7 billion, or 8.3% of the total of CFA 129.4 billion.

In comparison, the ARC payout represented 61% of the total mobilised 2015 PNR budget, with the United Nation's Central Emergency Response Fund providing 14%, and other development partners 19%. The total mobilised budget was 44% of the 'initial' budget. Faye and Watt (2017: 21) note that 'The encouraging PNR results have been facilitated by a number of factors [including] the availability of ARC funds, which provided an opportunity for the mobilization of substantial resources to support the Plan'.

The Kimetrica Process Evaluation (p. 26) notes that the ARC Senegal Country Strategy Paper had estimated that severe droughts have a response cost of at least US$ 80 million and that the total ARC payout received in 2019 amounted to 28.9% of this amount. However, especially in the light

[28] In the source, most funds were cited in US dollars; other currencies were converted to dollars at July 2020 rates: US$1.00 = CFA 580 = €0.87.

[29] The rest of the direct support for the economy from donors went to a variety of goals, separate from direct emergency relief to vulnerable households. For instance, GoS re-allocated US$ 115 million to support the health sector and 'far more for economic stimulus measures and help for the poorest households, paying for food, water, and electricity' (Chakamba, 2020). Chakamba cites a KPMG report for the figure of US$ 115 million for health sector support.

of the changed context as a result of COVID-19 it is not possible to assess the adequacy of the funds received relative to need.

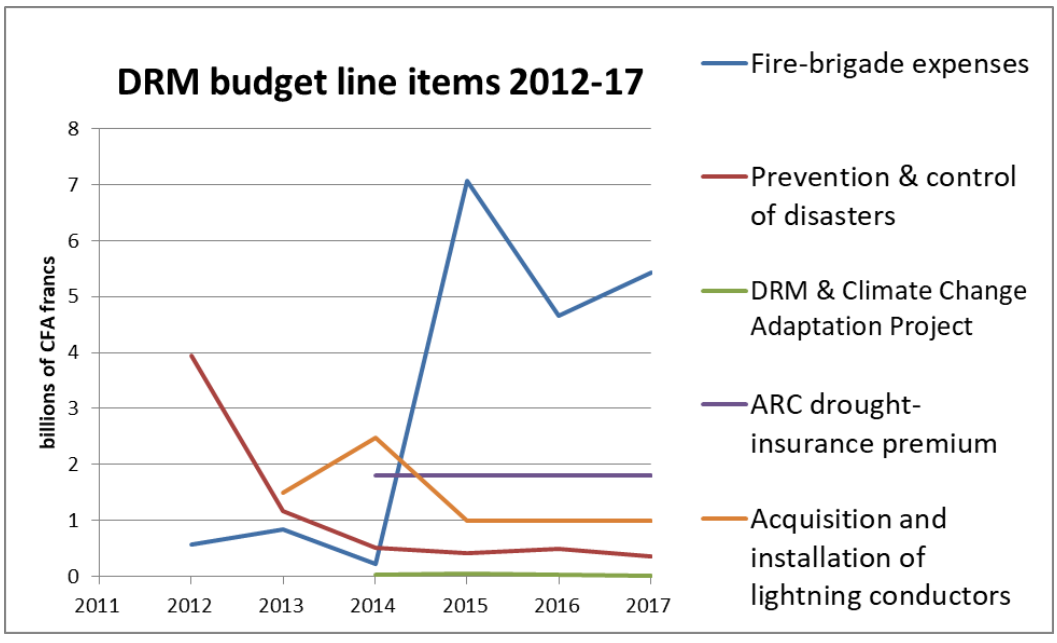
4.2 What resources have been budgeted and used for DRM in Senegal, and how has this changed over time?

Budgeting for the ARC insurance premium has largely replaced a previously higher but fluctuating annual budget for 'prevention and control of disasters', and has been integrated into the budget process, along with payouts under ARC insurance policies. ARC has therefore contributed to greater predictability in budgeting, while ensuring additional resources have been made available to deal with drought. However, GoS delayed making its payment of premium to ARC in 2018 and, following an unexpected increase in the premium due, did not make a premium payment in 2020. It has now rejoined the pool and paid for 2021/2.

DRM items appear in the national budget under the Ministry of the Interior because its DPC has the legal responsibility for supervising DRM activities. DPC includes the ARC insurance premium among its DRM items to be included under the 'DRM' budget line.

Figure 5 shows the Ministry of Interior's budget line items for DRM from 2012 to 2017. The line item that dominates the start of this period is the general 'Prevention and control of disaster', which covered a range of DRM expenses that ARC drought insurance would later replace. By 2014, when GoS paid its first ARC premium, this item had fallen to about a tenth of its 2012 value. It continued at a similar low level at least until 2017. In 2014, a World Bank project to support the planning of DRM and climate change adaptation within DPC appears as a minor budget line. In 2014, ARC drought insurance premiums start with an annual cost of CFA 1.8 billion (about US$ 3.1 million). The horizontal line of constant premium payment out to 2017 contrasts with the inter-annual variation in the other budget items, and emphasises the advantage of insurance in spreading DRM costs over time.

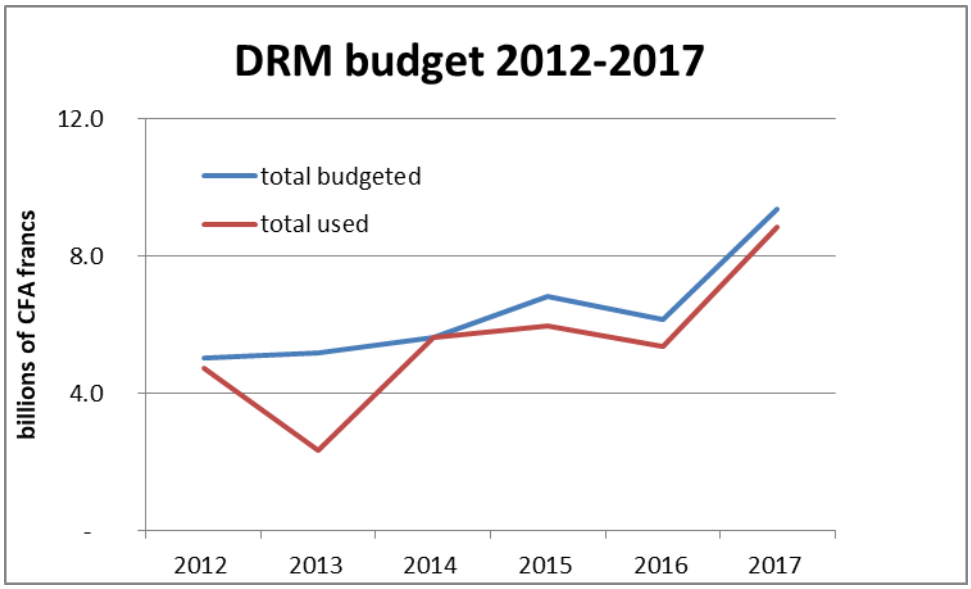
Figure 5: Ministry of Interior DRM budget line items



Source: data supplied by MFB, *Ministere de l'Intérieur, Budget dédié aux risques de catastrophes*

Figure 6 shows the total DRM budget and budget utilisation for 2012 to 2017. In 2013, MFB disbursed only CFA 2.31 billion: 45% of a budgeted total of CFA 5.18 billion. In the next year, 2014, the year of ARC Ltd.'s first drought insurance pool, disbursements essentially reached 100%, and they stayed above 85% until 2017, the last year for which data are available. Note also that GoS spending on DRM rose from the start to the end of this period, from CFA 4.7 billion to CFA 8.9 billion, an annual average increase of 13%, or roughly twice the rate of GDP growth over the period. Figure 6 omits the receipt of CFA 9.6 billion, representing the payout from ARC in respect of the 2014 drought.

Figure 6: Ministry of Interior DRM budget and expenditure



Source: data supplied by MFB, *Ministere de l'Intérieur, Budget dédié aux risques de catastrophes*

In each year from 2014 to 2017, MFB budgeted and paid its unchanging ARC drought insurance premium. GoS paid ARC Ltd. the full costs of annual drought insurance, without donor support. For 2018–20 inclusive, MFB budgeted the same premium. However, in 2018, MFB did not disburse this line item and the GoS premium for ARC's fifth drought insurance pool was not paid in that year. This was eventually paid as a retention by ARC from the payment to GoS in 2019. In 2019, a single premium was paid for the sixth pool.

In 2020, ARC Ltd. made the following changes to the customisation of Africa RiskView (ARV):

- The minimum attachment level[30] was set to one in four years across all countries, rather than one in five as had previously been the case for Senegal.
- The minimum benchmark duration to be used moved to five years.
- The rainfall dataset from 2001 to present was to be used (for earlier pools, it had been from 1983).

[30] The minimum severity of an event loss which gives rise to a payment. It is the loss value at which a policy contract is triggered.

These changes disadvantaged Senegal because its incidence of drought has been relatively high since 2000, making it a riskier option for ARC Ltd., and thus increasing its premiums (or reducing its payout for the same premium). In contrast, other countries with different drought profiles before and after 2000 found their premiums unchanged or falling.

As a result, while seven other countries approved these changes and renewed their policies for 2020, the GoS considered dropping out of the seventh pool and delayed its premium payment meaning that no coverage was available for Senegal in 2020 as ARC Ltd, FCDO and KfW had specifically ruled out offering insurance on credit in order to comply with membership policies and sound commercial practice for insurance companies. In line with the tripartite agreement been the GoS, the Start Network, and ARC Agency, the Replica partner therefore could not renew its insurance policy.

GoS has since rejoined the pool, paying the premium for 2021/2. Key informants agreed that the GoS decision not to pay the insurance premium in 2020 principally reflected the short notice and insufficient consultation from ARC, in that the changes were communicated once customisation had already been completed and with discussions began only on 1st April 2020 (when Senegal would have been expecting to sign the policy, not to reset the parameters).[31]

[31] See also FCDO (2021).

5 Findings: disaster risk management capacity

5.1 To what extent and how has Senegal's capacity (institutional, organisational, and individual) to anticipate, plan, finance, and respond to climate-related disasters changed since Senegal joined ARC? How has ARC contributed to this?

The main developments in Senegal's DRM capacity since 2014 relate to: (i) the intention to develop a stronger policy framework for DRM within the Sendai Framework though the process for developing a national strategy only began in November 2020; (ii) reorganisation of responsibilities between government agencies in particular following from the abolition of the Prime Minister's Office, though these have left unresolved the status of the ARC Steering Committee and funding arrangements for the TWG; (iii) improvements in the social protection system (with World Bank support) that have improved the identification of vulnerable households and that have developed models for cash transfer for government welfare grants, although these have not been used by GoS for disaster response, and there are weaknesses in the quality of the RNU used to identify vulnerable households; (iv) the establishment of the Start Network as the ARC Replica partner; (v) strengthened capacity for risk modelling, early warning, risk transfer, and operational planning; (vi) strengthened M&E approaches introduced by the Start Network, although GoS monitoring of disaster response has however not improved significantly.

ARC has contributed to strengthening DRM capacity in Senegal principally through: (i) encouraging regular updates of operational plans and providing technical support to this process; (ii) ARC Replica's encouragement to NGO initiatives through the Start Network; and (iii) provision of the ARV system, and training support for it, which has contributed to strengthened analytical capacity, although the ARV is not used for estimating support requirements, with reliance instead on the Cadre Harmonisé developed by CILSS. The effectiveness of capacity development support provided by ARC has to some extent been reduced by trained government staff moving on to other roles but in some cases they remain working on DRM issues for instance for NGOs.

5.1.1 Developments in DRM policy

GoS has committed itself to implementing the Sendai 2015–2030 Framework for Action for Disaster Risk Reduction, which highlights issues affecting human health and well-being that are relevant to disaster risk reduction, climate change, and sustainable development. The Sendai Framework was adopted on 18 March 2015.

At the sectoral level, the Ministry of the Interior's 2017–27 'sectoral policy letter' gives an important place to DRM. To bring Senegal in line with Economic Community of West African States (ECOWAS) orientations, the policy letter envisaged the creation of a National Civil Protection Agency to complete the construction of the national civil protection system, but this has not happened.

In November 2020, Senegal embarked on the development of a national strategy for disaster risk reduction, led by the Ministry of the Interior. This will involve developing an action plan for 2021–30

based on the Sendai Framework for Action and the national development strategy (the 'Plan for an Emerging Senegal'), and the Sustainable Development Goals. This will involve developing a comprehensive strategy for risk financing.

5.1.2 Reorganisation of DRM responsibilities

Responsibilities for DRM in Senegal are distributed across many government agencies. Before 2019, key decision-making lay in three locations, as follows:

1. The President's Office, which housed the *Délégation Générale à la Protection Sociale et à la Solidarité Nationale* (DGPSN), with a strategic coordination role for social protection policies and interventions, and which, in turn, oversaw the CSA, responsible for buying, storing, and distributing rice and other foodstuffs.

2. The Prime Minister's Office, which acted as arbiter between DRM and food security agencies, and which housed SECNSA (responsible for the coordination of food security policy and strategies).[32]

3. The Ministry of the Interior, specifically the DPC, which is responsible for DRM (except in the case of food security – see SECNSA) and the contact point for ARC.

In 2019, two major changes took place. First, the President's Office placed DGPSN (with a different and diluted mandate) and CSA in the new (2018) *Ministère du Développement Communautaire, de l'Équité Sociale et Territoriale* (MDCEST, Ministry for Community Development, and Social and Territorial Equity). The shift of DGPSN from the President's Office to MDCEST occurred while the World Bank was building DGPSN's capacity to provide a social safety net through family welfare payments. Second, the Prime Minister's Office was abolished. Since then, the Ministry of Interior has had more influence over DRM: it has assumed the role of arbiter while retaining a direct influence over DRM through the DPC.[33] Under the current system, DPC delegates the coordination of the response to food security crises to SECNSA.

The ARC coordinator, currently a civil servant with a background in the *Secrétariat Exécutif du Conseil National de Sécurité Alimentaire* (SECNSA, the Executive Secretariat of the National Council of Food Security), administers ARC affairs in Senegal and coordinates the TWG. The experts are not seconded to the TWG but are instead required to give their time to it, as needed. They mostly remain physically in their agency offices, so the TWG exists as a series of meetings, exchanges of documents, and conversations (physical and virtual) between the full group or its sub-groups, as appropriate.

Based on a memorandum of understanding between GoS and ARC, the Prime Minister's Office created an ARC steering committee (Prime Minister's Order No. 6966, dated 17 May 2013). Article 2 of the decree defines the responsibilities of the steering committee. However, key informants noted that this arrangement has become obsolete with the abolition of the post of Prime Minister

[32] In Senegal, DPC (in the Ministry of Interior) has overall responsibility for managing DRM, with the exception of food security crises, the coordination of which a decree allocates to SECNSA. SECNSA exercises this strategic responsibility principally through its coordination of the government's PNRs, which includes planning, targeting, and M&E. This arrangement was already in place in 2014.

[33] SECNSA was moved to the General Secretariat of the Government on the abolishment of the Prime Minister's Office. Separate from this changing institutional landscape, the MEPA/DIREL (Livestock Ministry) and MSAS/DAN (nutrition) remain relatively independent, while CLM (nutrition) remains under the unchanged General Secretariat of the Government.

(see Section 5.1), with the result that ARC's operations in Senegal do not have a specific legal underpinning. In addition, the TWG has no dedicated financial resources from the state budget.[34]

5.1.3 Improvements in the social protection system: RNU and cash transfers

The capacity to respond to disasters has improved because of the stronger social protection system that DGPSN has created for non-disaster identification of vulnerable households and corresponding cash transfers.[35] An important step has been the establishment of the RNU, which contains data on over half a million households identified as vulnerable. This is described more fully in Annex G.

Although the Start Network's use of the RNU for targeting during 2020 showed that it contained errors and omissions, and that updating procedures need to be improved,[36] the RNU represents an important step forward. In 2014, the RNU did not exist, although the *Programme National de Bourses de Sécurité Familiale* (PNBSF, National Family Welfare Grant Programme) already held an RNU prototype, with data for about 130,000 poor and vulnerable households. In May 2019, the number of households identified in the RNU had reached 460,000 (Ndiaye *et al*., 2019), and by the start of 2020 it reached 580,000.

There have also been moves to test the use of cash transfers as a form of social protection support. This has been supported by the World Bank's US$ 40.5 million Senegal Safety Net operation (2014–24), to which an additional US$ 57 million was added in 2019. With this funding, DGPSN has linked poor households to their entitlements from social, health, and nutritional programmes through accessible and secure cash transfers, with the RNU forming part of the system (World Bank, 2016). World Bank ratings on progress towards project development objectives and overall implementation progress have been 'satisfactory'.

In 2018, a World Bank summary of the context for its additional funding for its social Safety Net project (World Bank, 2018) noted that: 'The CEC [equity card] programme targets 50,000 disabled individuals across the country, providing them with access to various services such as the CMU [universal health insurance] and cash transfers.' This was a test, using the RNU, after which GoS adopted these changes 'and decided to promote harmonized use of the cash modality and the RNU', as a result of which 'RNU and cash were used during a special operation to respond to food insecurity in Mattam [region] in February 2018 and instructions were given to food security actors to use the same set up for the 2018 food security response.' It was envisaged in operational planning for the potential use of ARC resources that cash transfers would subsequently be used as an instrument (as they had not been in the past), building on this experience.

SECNSA has established a memorandum of understanding with RNU for data exchanges covering money transfers in a food insecurity context (as have WFP, CLM, and PNBSF), anticipating efficient cash transfers as part of drought relief (DGPSN, 2018).

[34] Key informants considered that this situation left arrangements for ARC precarious and incomplete, but so far this has not affected the effective operation of ARC's technical teams.
[35] CLM is involved in non-disaster cash transfers.
[36] RNU updates take place only every four to five years, so it cannot in itself provide complete and up-to-date identification of all vulnerable households. There is a complaints management committee that can intervene in cases where a household has been taken out of the database unjustifiably.

5.1.4 ARC Replica and the Start Network

The main institutional change that ARC has brought about since 2015 has been the establishment of the ARC Replica arrangement with the Start Network. Key informants considered that GoS was initially cautious about working alongside NGOs as partners, since it felt that it was itself capable of overseeing drought relief distributions, saw little need for the NGO consortium, and felt the role and status of government risked being unnecessarily diminished. However, the increase in total resources for drought relief that the arrangement implied, as well as the commitment to working jointly (including the fact that GoS must approve the Start Network FIP, and ARC must approve the two FIPs as an integrated plan) persuaded GoS to support the initiative.

The establishment of ARC Replica has facilitated cooperation between six of the biggest NGOs, provided a guaranteed source of funding for NGO operations, and has institutionalised cooperation with GoS through SECNSA and other agencies. Technical staff of the Start Network's NGOs have also now become part of the TWG and its sub-groups, providing an additional source of expertise.

The process of joint planning led to GoS and the Start Network dividing responsibility for ARC-funded disaster relief work in Senegal's 14 regions. The Start Network has been more easily able to innovate in its approaches than GoS (for instance in the use of cash transfers), and has been better resourced to carry out M&E, so that its operations may lead to lessons that can be reflected in future GoS practice. There has also been progress in bringing the cost structures of the FIPs more closely together.[37]

5.1.5 Risk modelling and early warning

To improve Senegal's capacity to anticipate and plan, ARC introduced its ARV drought risk modelling platform in Senegal in 2014, and trained GoS's TWG sub-group in its use, with a view to providing an early warning tool for drought that estimates its impact on vulnerable populations and calculates the corresponding response cost. Once customised, the ARV parameters form the basis of negotiations between Senegal and ARC Ltd. for a drought insurance policy. ARC has held regional and Africa-wide training workshops for individual analysts working with ARV, and has enabled a virtual ARC user group. Senegalese early warning specialists have attended and have benefitted from both activities. In addition, SECNSA received ARV software training from ARC in 2020.

The ARV model can be configured for any rainfed crop. Initially ARC supported the configuration and calibration for groundnuts, a cash crop that is important in food-insecure areas. In response to comments from Senegalese early warning specialists, ARC added a millet version, to better represent the reality in zones where that crop is important. Together, groundnuts and millet account for more than 80% of Senegal's cultivated area. Combining the models gives a more complete characterisation of drought effects. Similarly, a 2021 initiative will pilot a rangeland model that extends ARV to the production of pasture and browse in pastoral areas.[38] With these variants, key informants considered that ARV is an effective predictor of drought for different parts of Senegal.

[37] For the 2019 FIPs, GoS has 5% overheads, and the Start Network has 7%.

[38] North-eastern Senegal has a large pastoral zone. ARC/TSD has been slow to introduce to Senegal a version of ARV for rangeland (pasture and browse) but this is in progress. The new model will be based on the normalised difference vegetation index (NDVI), a near-infrared measure of plant greenness available directly as satellite images, will require fewer data, and will be less challenging for risk analysts.

Senegal's ARV sub-group mastered the software quickly and customised it for use in Senegal in time for the 2014 drought. The choice of the early warning sub-group members and ARC's Technical Support Department (TSD) training has produced one of Africa's best concentrations of ARV expertise. Key informants noted that the sub-group undertakes its own analyses, does upgrades on its own, and takes the initiative to develop ideas. The sub-group's peers from Mauritania, Gambia, and Togo have each visited Senegal to work with the sub-group and to learn their techniques.

This success may have improved capacity for disaster planning but GoS does not use ARV for this function. As Senegal's food security coordinator, SECNSA uses the *Cadre Harmonisé* (CH) developed by the *Comité permanent inter-Etats de lutte contre la sécheresse dans le Sahel* (CILSS, the Permanent Interstate Committee for Drought Control in the Sahel)/AGRHYMET,[39] as the government's planning tool. It has continued to use CH because it incorporates information not only about drought but also about climate and floods, among other factors, providing a model that is broader and more complete than that of ARV. The CH has also been a central focus of regional early warning in West Africa for two decades. The NGOs with which SECNSA works have also opted to use CH. ARV is, however, used to define parameters for the calculation for ARC's parametrised insurance policies.

The Kimetrica Process Evaluation noted that in 2019 FIP completion was delayed because inputs from the CH relating to the number of affected households at a local level were not available, as the CH meeting did not occur until after the FIP submission deadline set by ARC guidelines.

5.1.6 Risk transfer

The risk transfer sub-group contains MFB officials responsible for budgeting the payment of the ARC insurance premium, concluding insurance cover, and making ARC funds available to the implementing agencies once ARC Ltd. makes the insurance payout. This sub-group is one of the ARC member states' most experienced, having negotiated seven consecutive drought insurance contracts. Each year, the early warning sub-group re-parameterises the ARV models explaining crop production (groundnuts, millet) in terms of rainfall, adding the new data from the recent rainy season (including soil humidity), and any changed agronomic technical coefficients. The revised model, which assesses the risk that Senegalese agriculture will suffer from drought, is sent to ARC Ltd. On the basis of the revised risk, ARC Ltd. can quote the payout for a given premium or the premium needed to ensure a given payout. This is the starting point for discussions with the risk transfer sub-group.

Given the premium level, a declared attachment point (the rainfall threshold that triggers an ARC payout) and Senegal's risk profile, if the next rainy season's rains trigger a payout, ARC can give the size of that payout. For a given set of food rations, etc., this information allows operational planners to estimate the number of households to which they can distribute rations. It also allows them to use CH to establish the difference between the number of households negatively affected

[39] CILSS is the Permanent Interstate Committee for Drought Control in the Sahel, set up after the disastrous 1968–74 Sahelian drought. In 2000, CILSS' agrometeorological and hydrological centre, AGHRYMET, started developing a framework to identify and analyse zones at risk and vulnerable groups in the Sahel, harmonised to ensure methodological consistency and seeking consensus among food security experts with different expertise. Over several iterations, it has integrated modifications to distinguish food crises from nutrition crises and to link to the Integrated Food Security Phase Classification (FEWSNET *et al*., 2010).

by a given drought and the number for which the ARC payout will allow distribution of a standard ration.

Unlike the early warning/risk modelling and operational planning teams that liaise closely with ARC, Senegal's risk transfer sub-group works independently of ARC Ltd., in the sense that it does not need support for decision-making to determine risk transfer parameters. Instead, the sub-group does this independently with a spreadsheet tool provided by ARC Ltd.

5.1.7 Operational planning

The **operational planning sub-group** includes representatives of public sector relief aid implementing agencies, principally CSA (food distributions), DIREL (sales of subsidised livestock feed), and DAN and CLM (nutrition agencies), as well as NGO representatives. These agencies undertake procurement and subcontract distribution logistics (trucking and warehousing) to the private sector. The sub-group drafts the FIP that the Agency Board must approve before sending a memo to ARC Ltd. detailing this approval[40]. The FIP specifies the mix of relief aid activities to be undertaken and, for each, the number of beneficiaries, the unit cost, and the administrative areas in which they will take place. The sub-group works with the Start Network (which must also complete an ARC FIP) to ensure that the two FIPS are mutually compatible, and with SECNSA to ensure that, taken together, these FIPs are consistent with GoS aims. SECNSA has a coordinating role for all drought relief planning, including that which uses ARC funds.

Every two years (since 2014), a TWG committee brings together all actors to generate an ARC operational plan. ARC requires these for a member state to remain in good standing and thus be eligible for drought insurance from ARC Ltd. SECNSA coordinates this process, though key informants noted that (except in 2020) GoS has not funded the operational plan process, and that technical and financing partners, including ARC, have supported it. ARC has provided feedback on each successive operational plan[41] and the accompanying budget that takes into account the agreed ARC payout level.

The biennial operational planning exercise brings technicians, technocrats, NGO personnel, staff of implementing agencies, and risk transfer officials together to convert the CH estimates of the numbers and spatial distribution of the affected vulnerable population – and the costs of remedial activities – into a plan. This gathering is itself positive for building a Senegalese DRM community. Having, as a result, a valid operational plan with a set of pre-appraised options from which they can choose at short notice in order to draft a FIP is much better than the pre-ARC days, when the starting point may have been an older and less relevant document. ARC staff work with Senegalese operational planners and can challenge them on issues that the planners may not have considered.

5.1.8 Monitoring information and systems

There has been little progress in strengthening monitoring information and systems within GoS. SECNSA, responsible for early warning, coordination, and policy in the area of food insecurity, does not have the equipment or trained staff to provide accurate statistics at short notice (Branders *et al*., 2018). Their absence makes coordinating the DRM community more difficult. At present,

[40] On receipt of the memo and signed loss certificate from the country/Replica partner, the ARC Ltd. Board then approves the pay-out.
[41] Key informants from ARC considered that the technical quality of the operational plans has increased in each iteration.

SECNSA staff sometimes rely on NGOs for transport to the field to gather information in person. No ICT system exists to enter field staff members' data into a database, or to automatically generate reports based on integrated data. No improvements in SECNSA's M&E for DRM have taken place since 2014, so its 100 staff nationwide are rendered less efficient, without updated flows of information, and SECNSA's long-term learning from historical trends is limited.

In traditional reporting in Senegal, information travels up a hierarchical chain (arrondissement → department → region → Dakar), being aggregated with other information from the same level when it reaches the next level. This slow method may involve the discarding of potentially useful information at each stage. In a break from this traditional reporting, GoS had included in its 2019 ARC FIP a set of indicators that would have allowed it to assess its aid distribution performance. It did not do so in 2020, largely because of resources being diverted to the enlarged PNR.

In contrast, the Start Network has established a more effective M&E capacity that in 2020 allowed it to track its activities. In particular, it collected data to construct the performance indicators that its FIP and GoS's FIP have in common.

5.1.9 ARC's capacity development support

Initially, ARC training was provided to bring the TWG sub-groups up to speed on protocols and software. In more recent years, training has taken the form of annual Africa-wide and West African regional workshops in which team members can present their work and discuss approaches with their peers, e-mail exchanges in virtual groups with these peers, and inter-country exchange visits between sub-group specialists. Details of Senegalese participation in these events are provided in Annex D. Team members stay in contact with a technical focal point in ARC's TSD – one for each sub-group – who coordinates the national technical expertise.

As with other capacity-building efforts, some part is dissipated as staff move on to new roles, with the loss of institutional memory. This study found that several TWG interviewees for this study were new and had relatively little knowledge of some of the relief efforts that followed the 2014 drought, or of ARC's role in TWG over the intervening years. However, some trained TWG staff move to NGOs and, given the greater integration of NGOs into the current DRM system, they may reappear in new roles without a loss of technical knowledge to the system as a whole. ARC has taken the precaution of training backup experts for each post, so that when it runs workshops, at least two backups attend, in addition to the principal expert. GoS/Start Network staff participate fully in the training provided by ARC.

ARC's technical support has taken over from the support previously provided by the World Bank. In 2012, the World Bank financed the US$ 1.1 million DRM and Climate Change Adaptation project, with a focus on flooding, based in DPC. After the first phase from 2012 to 2014, the World Bank anticipated a second phase that would consolidate national geographic information system (GIS), capacity to manage risk, an early warning system, a risk-awareness campaign, strengthening of DRM financing, and support to the National Strategy for the Protection of Coastal zones (World Bank, 2012). Our understanding is that this project was not taken forward.

5.2 To what extent and how has ARC contributed to building stakeholder commitment and effective cooperation in DRM?

ARC has contributed to building stakeholder commitment and cooperation, in particular through providing a structured process around the insurance product (particularly

preparing the FIP), which requires DRM actors to cooperate, and by supporting the establishment of the ARC Replica arrangement, which encourages structured cooperation between GoS and NGOs.

Key informants considered that stakeholder coordination in general improved between 2014/15 and 2019/20 (although it already been quite strong), and that ARC has made important contributions to this. In establishing its relationship with GoS, ARC made a commitment to provide various deliverables – financial (insurance), technical (TWG training), and organisational (Replica) – and it has proven to be a dependable supplier of these services. Working in a complex, multi-stakeholder environment, it has built trust over seven years as it has delivered on that commitment. Key informants noted that ARC uses well-qualified, diplomatic, careful, and assiduous staff for each task. ARC has contributed to building stakeholder commitment and cooperation through the following (see Table 5):

1. ARC has provided an insurance product that is well priced and that makes financing risk easier for Senegal. The fact that GoS finances its own insurance premium, rather than relying on donor funding, is a sign of strong GoS ownership.

2. Training and building the capacity of TWG has allowed ARC to show its patient professionalism as it reinforces the technical core of DRM in Senegal, a core that plays an important role not just in ARC Ltd.'s insurance but also in SECNSA, which coordinates and monitors drought-related relief.

3. The discipline of preparing the FIP brings DRM actors together in a phased and regular way that gives each of them a sense of the wider issues that define the context within which they all work, and requires cooperation and the development of a commitment to a common goal.

4. ARC, along with WFP and NGOs, has developed an innovative approach that channels the funding for six international NGOs' individually designed and implemented drought relief initiatives into common funding for a second 'Replica' drought insurance premium for Senegal.

5. The six NGOs collaborate as part of the Start Network consortium, which implements the FIP for the use of the second ARC drought insurance payout. This allows them to design larger drought relief activities than they would be able to as individual NGOs.

6. ARC has designed an incentive system for the operation of the FIP for the second payout that gives GoS the final say on how the FIP is implemented. But, in practice, this is limited to the GoS FIP and the Replica FIP sharing common targeting and M&E methodologies. This gives the Start Network freedom to design and implement large drought relief projects, and gives it the incentive to collaborate fully in TWG sub-groups, in FIP preparation, and in the coordination of implementation.

7. The allocation by GoS of some ARC funding of nutrition support through DAN and CLM in 2020 was reported by key informants to have encouraged other donors to expand their nutritional support work from the original targeted regions to cover the entire country.

Table 5: ARC's contribution to stakeholder commitment and cooperation in DRM

ARC action	Commitment/cooperation	Result
1. Getting agreement within GoS to (a) finance DRM via ARC drought insurance, and (b) annually pay the insurance premium	The ARC insurance product requires commitment within government and the annual payment of the insurance premium reinforces that commitment. TWG's risk transfer sub-group links ARC to GoS, which makes this process more effective.	Without ARC's insurance product, each successive drought would require GoS to find fresh financing, with its own re-budgeting complexities.
2. Training and capacity building of the TWG	ARC and GoS agreed to set up TWG in 2014 and ARC Agency has been training its staff and building its capacity ever since. Building the skills and team spirit of TWG is at the heart of ARC's commitment to DRM in Senegal. TWG staff also work with SECNSA in early warning and contingency planning, so at the same time as their knowledge is essential to be able to meet the conditions for an ARC drought insurance payout they are also an essential part of GoS's DRM capacity. They now include Start Network members – see below.	Without a well-trained TWG, insurance payouts would not flow to GoS and Start Network FIPs and Senegal's DRM capacity would be much weaker.
3. Requiring the biannual updating of the operating plan and, in the case of drought, converting the current plan into an FIP	Phased cooperation was needed to: (a) re-parameterise ARV (latterly two ARVs – groundnuts and millet); (b) undertake field trips to assess agricultural, pastoral, and nutritional conditions; (c) incorporate HF findings into the mix to establish the scale and spatial extent of relief aid needed; and (d) reach agreement on the division of the payout between activities, before integrating FIP activities into the plans of the various agencies and, latterly, the Start Network.	Without ARC's requirement that the FIP, with its component parts, be a prerequisite for the insurance payout, only *ad hoc* cooperation would happen (at best).
4. Doubling the drought insurance cover for Senegal	As part of ARC Replica, six NGOs combine their resources in a consortium. Instead of independently seeking funding for drought relief activities, which might not be well-coordinated, they collectively seek funding of a second ARC drought insurance policy for Senegal, with GoS approval. GoS has ultimate control over the use of the second payout and, in total, gets roughly twice as much insurance coverage. Further, GoS now deals with a single, more professional NGO actor, albeit one representing a lot of expertise and capacity.	Without ARC Replica, Senegal would receive half the drought insurance it received in 2019.
5. Collaboration between six of largest international NGOs working in Senegal, previously operating independently, as the Start Network	NGOs worked together as a collective through the Start Network, rather than individually, to engage with GoS on drought response. Their guaranteed funding, common positions, increased technical competence (supported by Start Network staff in the UK) and increased capacity in Senegal, has shifted the relationship with the GoS	NGOs have a more influential seat at the table with the GoS, resulting in improved contingency planning and greater technical scrutiny on ARV

ARC action	Commitment/cooperation	Result
6. The integration of the Start Network into the Senegalese DRM system	The Start Network has become an effective part of the Senegalese DRM system, leading to more effective cooperation with SECNSA than was the case in 2015.. Reinforcing this partnership, Replica rules require the joint elaboration of the GoS and Replica FIPs, with common targeting and M&E frameworks but freedom for the Start Network to design its own drought relief activities. The Start Network is thus integrated into what has become a common endeavour.	Improved collaboration and working relationship between NGOs and GoS

5.3 To what extent and how have improvements in capacity contributed to a more effective response to drought?

The difference in the scale and nature of the 2014/15 and 2019/20 crises makes a direct comparison difficult, but the study found:

1. Significant improvements in the planning process contributed to the combined FIPs representing a strengthened approach to dealing with the drought in 2019 compared to earlier periods. The subsequent onset of COVID-19, and the development of the much larger PNR, meant that the GoS FIP was not implemented as planned, though it informed the subsequent PNR.

2. As in 2015, there were significant delays in the release of funds from the ARC payout to GoS by the Treasury due to delays in getting the appropriate authorisations and signoffs from senior level officials.

3. There were significant improvements in the approach to targeting as set out in the FIPs. However, the large increase in the number of beneficiaries in the PNR meant that this approach was not implemented by GoS. The Start Network did implement its intended targeting approach, which revealed weaknesses in the RNU data.

4. A more rigorous review of gender issues in 2019/20 identified weaknesses, including a lack of female involvement in DRM planning, while GoS data collection still did not track distributions to female-headed households. Start Network's M&E system has, however, collected more comprehensive information related to gender.

5. There were no significant improvements in the M&E approach used by GoS. However, the M&E system used by the Start Network provided significantly more information about the effectiveness of support provided than had been available for the 2014/15 experience.

6. Implementation was adversely affected by both the travel and contact restrictions imposed in response to COVID-19 and the delay in releasing ARC funds. The main innovation compared to previous drought response was the use of cash transfers by the Start Network. This appears to have worked well, but the limited M&E information available (and the lack of a control group who did not receive aid) limits the extent to which the effectiveness of implementation overall can be assessed, and the degree to which comparisons of the effectiveness of alternative modalities can validly be made.

Subject to noting the differences in the scale and nature of the crises to which response was made in 2014/15 and 2019/20, this section provides a comparison[42] along the following dimensions:

1. planning and coordination;
2. release and spending of ARC funds;
3. targeting;
4. gender;
5. M&E; and
6. implementation of aid distribution.

5.3.1 Planning and coordination

Key informants considered that coordination and oversight by SECNSA had improved in 2019/20 compared to the previous experience, in particular with the Start Network providing an effective coordination approach for the NGO sector. Key informants considered that GoS had played a more assertive role in DRM in 2019, and in particular in response to COVID-19 in 2020 (including organising the response around the revised PNR and requesting that the ARC FIP be included within it), compared to the 2014 drought, when WFP and NGOs played a relatively greater leadership role.

Observers did not have to wait until the end of the poor 2019 rainy season to realise that there was going to be a negative effect on crops and livestock, and thus human nutrition. Field agents from various ministries and NGOs began reporting signs of drought. Early warning teams, including agronomists, range management specialists and nutritionists, did surveys. ARC warned that the parametric insurance threshold was likely to be breached. Once the formal notification of a payout arrived in early September, the operational planners from GoS and the Start Network worked with SE-CSNA to draft the FIPs, which were completed in time to meet the needs of the AgencyBoard, although as noted in section 5.1.5 there were delays in finalising the FIP as a result of the need to obtain information from the CH on the numbers of drought affected households. This resulted in timely payouts being made in December 2019.

The early December 2019 meeting was expected to validate these details. However, this meeting was scheduled to take place after the ARC Agency Board meeting to approve the FIP. The ARC Agency Board showed some flexibility, allowing time to incorporate the CH details into the draft FIPs, to establish for each FIP the numbers of beneficiaries that could be targeted with the payout funds, and to submit the definitive FIPs for approval, which was forthcoming. The Agency Board notified its approval to ARC Ltd., on the basis of which the payout was made. The GoS payout arrived in Dakar on 13 December 2019; the Start Network payout arrived in London on 19 December 2019. All the personnel mentioned had cooperated well to reach this stage.

No equivalent of the Start Network existed in Senegal in December 2014, when a delay occurred in the validation of the PNR document. The many humanitarian partners that then operated independently (ACF, ACTED, Red Cross, etc.) waited until the PNR had been validated before writing

[42] The main sources for the 2014 experience in the text that follows are Faye and Watt (2017) and ARC (2016). Sources for the 2019/20 experience are the Kimetrica process evaluation and KIIs.

proposals for grants to the European Community Humanitarian Aid Office (ECHO) or the United Nation Central Emergency Response Fund to fund the PNR activities that each would implement. They had to write these proposals in the short period between the validation of the PNR and the start of PNR activities, leaving them little time for funding delays. In 2019, with the Start Network an integral part of the PNR process and receiving funding from ARC, no such problem existed: the FIPs were prepared according to a calendar geared towards obtaining ARC board approval in early December.

In 2014/15, SECNSA's oversight of PNR preparation aimed to be consensual and participatory. For an effective drought response in Senegal, it is essential that SECNSA links well to the different stakeholders, through meetings and the circulation of reports. However, at that time the organisation was considered by some key informants to be poorly coordinating and monitoring PNR implementation, as well as failing to share information with stakeholders. Progress reports for implementation did not appear, and the assessment report was produced late and was not shared with the other actors. Further, SECNSA and humanitarian partners did not agree on the targeting methodology for food assistance (with the latter preferring a more rigorous methodology).[43] In 2019/20, there was no criticism of SECNSA's coordination role by key informants. For instance, TWG members did not mention reports being produced late or not being shared, and SECNSA had a good relationship with the Start Network, though it had less well-developed ties to the GoS implementing agencies.

5.3.2 Release and spending of ARC funds

Delays as described below contributed to both GoS and the Start Network delivering at least part of their food/cash support to households after the 180-day upper limit ARC imposes.[44]

GoS payout

In both 2014/15 and 2019/20, there were significant delays between the receipt of the payout from ARC Ltd. by the GoS Treasury (which in each case took place within the agreed timeframe of 30 days from the attachment point being reached) and the release of funds for expenditure by GoS.

Following the 2014 drought, the ARC payout to GoS took place in January 2015, but it is reported that it took five months[45] for the funds to be made available to be transferred to implementing agencies, and only 82% of the payout was spent during 2015. Therefore MFB wrote 'letters of comfort' on behalf of traders to help them get commercial credit to import rice. The net result was delays in food aid delivery, and additional bank charges. Separately, GoS failed to take targeting operations into account in the initial distribution of the funds intended to finance its food assistance. There was a further delay for re-budgeting to liberate those funds. The result was that targeting (i.e. drawing up a list of vulnerable households approved as recipients for food distributions),

[43] One other positive comment was that SECNSA's regular field monitoring missions deterred the influence of local political leaders in the choice of beneficiary areas.

[44] ARC specifies that activities funded by its payouts should start within 120 days and finish within 180 days after receipt of the ARC payout. Following the 2019 drought, ARC Ltd. transferred the GoS payout on 13 December 2019 and the Start Network payout on 19 December 2019.

'Significant delays in the implementation of the programme, in particular the rice distribution, were observed. [By August 2015,] only the first out of three phases of rice distribution was completed, implying that the remaining rice distributions would coincide with the harvest.' (ARC, 2016: 8).

'First tranche transferred to NGOs in June 2015.' (ARC, 2016: 26).

initially planned for February–March 2015, finally took place in May–June. Ultimately, some food was delivered after the lean season had finished.

The summary audit of the 2015 ARC payout recommended that, in future, payouts should go to a special Treasury account dedicated to ARC funds, the lack of which contributed to significant delays in spending. Despite this, similar delays occurred again in relation to the 2019 payout. This reflects the fact that according to GoS rules, when unbudgeted funds, such as the ARC payout, enter the Treasury after the start of the fiscal year they can be admitted – and then accessed – but only following procedures that can normally take up to four months to apply, unless bypassed by presidential decree. The Kimetrica process evaluation and KIIs undertaken for this study found that there were delays in getting the appropriate authorisations and signoffs from senior level officials.

Although the payout was received on 13 December 2019, it is understood that the special Treasury account was not established until the following month. On 3 February 2020 the President's Office issued a set of decrees allocating the funds to the implementing agencies under the direction of the Ministry of the Interior. However, no release of funds from the special account took place until June 2020. During this period, GoS reformulated the PNR in response to the emerging impact of COVID-19 and the economic effects of lockdown, and used funds available to SECNSA, which were subsequently reimbursed from the ARC payout once targeting decisions were made in May 2020.

This had a knock-on effect in terms of delaying the targeting and implementation of the interventions. The Kimetrica Process Evaluation (pp 27-28) supplemented by KIIs conducted for this study noted the following results of the delay:

- CSA (charged with food distribution) did not receive funding until July 2020, at which time the ARC payout funds had been completely integrated into the larger COVID-19 Response Plan funds and used for the distribution of food and basic items, targeting poor and vulnerable households throughout the country. Once CSA received funding it moved quickly and had delivered 110,000 tonnes of rice before the end of July 2020.
- Funding was also provided to DIREL in July 2020.
- SENCSA did not receive funding until August 2020. Furthermore, of the 100 million CFA it was originally allocated, it only received 50 million CFA. Until receipt of funds in August, SENCSA continued coordinating overall activities using its own funding.
- MEPA did not receive funding until July 2020. However, this portion of the ARC funds were added to the COVID-19 Response Plan funds for the same purpose as originally intended in the ARC FIP—to buy animal feed to sell at subsidised prices. Due to the addition of COVID-19 Response Plan funds, a greater supply was purchased for targeted areas, serving a larger number of beneficiaries.
- CLM and DAN: These agencies did not initially received funding for the implementation of nutritional activities due to the suspension of all screenings, GoS and NGO alike, to prevent the spread of the virus. However, in November 2020, the nutritional agencies each received funding equal to that which had been specified in the GoS FIP.

Start Network payout

By January, the Start Network had disbursed funds to its six NGO members and targeting activities began, following its FIP. This involved participatory and inclusive meetings with residents, local

administrators, etc. to achieve consensus on which households would be the beneficiaries of the distributions. Field staff found that the RNU database, which served as a first-draft list of the beneficiaries, had errors and omissions, and compensating for these slowed the process down.

For the Start Network, there was a delay from April to June 2020 for the first distribution of support as a result of restrictions resulting from Covid-19. In-person awareness-raising sessions were replaced by print and radio campaigns focusing on hygiene, nutrition, COVID-19, and appropriate ways to use the cash which was distributed. Alongside cash, the Start Network distributed fortified flour and food supplements, as well as conducting awareness-raising activities. In addition, due to challenges with procurement, some agencies exchanged fortified flour for alternative in-kind nutritional support or for additional cash. All six agencies of the Start Network[46] combined distribution rounds (two rounds instead of three) to limit in-person contact and to ensure that support was received before the peak of the lean season. In addition, some agencies also distributed hygiene kits, and COVID-19 messaging was included in associated awareness-raising campaigns (Start Network, 2020).

Start Network distributed a total of CFA 2,882,309,650 through cash transfers. Due to favourable exchange rates, they were able to expand the number of direct beneficiaries from approximately 203,000 to more than 220,000 (Start Network, 2020). During the cash distributions, additional food supplements (3 kg) of millet, rice, corn, sorghum, cowpeas, and peanuts were also distributed to lactating and pregnant women and those with children aged 6–59 months old. This was followed by nutritional awareness-raising activities on how to use the supplements and cash, as well as activities to promote behavioural changes in hygiene and nutrition, all of which were conducted remotely.

5.3.3 Targeting

In 2015, the targeting of beneficiaries for food assistance encountered the following problems (Faye and Watt, 2017):

1. GoS had adopted CH as the basis for identifying regions requiring humanitarian assistance but some NGOs used the household economy approach. In itself, this divergence of methodological approach may not have been a problem but it created misunderstandings.
2. Lists of households provided by SECNSA to some NGOs contained duplications, errors of inclusion, and confusion over the names of villages and beneficiaries.
3. Village chiefs participated in the selection of beneficiary households, sometime creating bias.
4. Budgetary limitations prevented the carrying out of a verification survey to establish the reliability of the targeting and to allow the errors in the lists to be corrected.
5. There was an absence of mechanisms for complaints or for appeals by beneficiaries in the event of non-compliance with regard to the quantities of distribution of the type announced.

There were substantial improvements in the targeting approach embodied in the GoS and Start Network FIPs for 2019/20, drawing on lessons from the 2014/15 experience. GoS had improved the targeting methodology and most of the earlier problems had been solved. Specifically, SECNSA adopted a more sophisticated and satisfactory targeting method using the HF for

[46] ACF, Catholic Relief Services, Oxfam, Plan International, Save the Children, and World Vision.

identifying region requiring assistance, the RNU to produce a first draft intra-regional list of beneficiary households, and a participatory and transparent local process to involve local committees to finalise the selection.[47] The targeting protocol used included a verification survey to establish the reliability of the targeting and to allow errors in the lists to be corrected. The FIPs developed by GoS and the Start Network used a common targeting approach. In addition, the 2020 FIPs included a telephone hotline for complaints.[48]

The approach implemented by the Start Network in its FIP therefore involved the following steps:

1. an initial GIS spatial analysis of drought impact in the form of the CH's identification of Senegal's afflicted regions and estimates of the number of food-insecure households per region;

2. the use of the RNU to select from within each afflicted region households likely to be vulnerable to drought;

3. testing of RNU lists for each region to ensure that the data for the selected RNU households were accurate; and

4. a participatory and inclusive community-led, gender-sensitive, village-level process to modify, as necessary, the RNU lists to create the final distribution list.

However, the expansion by GoS of the number of households to be reached (from 160,000 in the FIP to 1 million in the revised PNR) in response to the impact of the COVID-19 lockdown led to departures from the agreed targeting methodology reflected in the GoS FIP. At the time that this decision was announced, the Start Network was targeting 200,000 vulnerable households in the RNU database for distribution. The database contained a total of 580,000 such households, leaving only 380,000 for GoS food distributions. This means that at least 620,000 households not identified as vulnerable in the RNU database would have to be reached to achieve the GoS target. The profile of the impact on households of the economic disruption caused by the COVID-19 lockdown is likely to have been very different from that of the drought, but neither the rationale for the level of the revised target nor the features of households that it was intended to reach have been documented, so far as the evaluation team has been able to establish.

In addition, the delay in the GoS FIP funds leaving the national Treasury mean that SECNSA, responsible for using the RNU to provide a first-draft list of vulnerable households, was not able to (a) work on using RNU to provide this first draft, or (b) get out into the field to do the participatory/ inclusive finalisation of the distribution list in January/February 2020, as had been intended. Instead, using its own normal budget, it did some analysis of the RNU data. However, the participatory process described in the FIP was not implemented due to delays in transferring the funds to the implementing partners (Kimetrica, 2020).

[47] This process was envisaged as involving the creation of local committees comprising local stakeholders, including women's associations, local NGOs, and local authorities. These committees were expected to help select specific communities, villages, and neighbourhoods within the ARC-targeted departments. Once the communities, villages, and neighbourhoods were selected, local village committees, each made up of six men and six women, were consulted to select which households would receive ARC-funded interventions. A local census, followed by a household need assessment survey, as recommended by ARC regulation for targeting, was conducted as part of the targeting process. Faith-based organisations and community leaders were also supposed to be fully consulted for advice and participation in meetings.

[48] GoS did not include this in its expanded 2020 PNR. However, the Start Network operationalised the hotline with some success.

5.3.4 Addressing gender issues

While the 2014/15 PNR was considered by key informants to adequately address gender issues, more rigorous analysis of the 2019/20 experience has identified weaknesses, including a lack of participation by women in decision-making. GoS data collection still did not track distributions to female-headed households, while the Start Network's M&E system collected more comprehensive information related to gender.

Key informants considered that in 2014/15 the PNR took gender into account in its contextual analysis, targeting, intervention modalities, and reporting. In particular, the nutrition component was seen as fully gender-sensitive, supporting women of reproductive age (though in some departments more than others), particularly pregnant and breastfeeding women suffering from malnutrition. The targeting criteria for the food assistance component favoured female-headed households. Women contributed to targeting assemblies at village and neighbourhood level. However, the PNR food assistance component did not document the number of female-headed households reached.

Most of the gender-relevant information from the process evaluation of the 2020 ARC payout to Senegal suggests inequality, possibly because of a heightened appreciation of what is required to foster gender parity:[49]

- Women were not generally found in great numbers within decision-making circles at the national, regional, and local levels. This held true for both the GoS and Start Network NGOs. (Kimetrica, 2020: 58).
- GoS's TWG has a male bias. Most importantly, the contingency planning sub-group may not have a great enough incentive to take women's needs and preferences into account in planning activities.
- The implementation of distributions has a male bias.
- GoS reporting was not disaggregated by gender of household head, reflecting the lack of progress in implementing a complete and effective M&E system. The Start Network's M&E system was set up to require gender disaggregation at the point of data entry, and allowed full analysis by gender of all beneficiary-specific data.
- Women, who tend to keep small ruminants, rather than cattle, may have been disadvantaged in the subsidised sales of cattle feed, which may not be optimal for sheep and goats. Further, cattle feed was available only in large (40 kg) sacks. Women may have found these heavy and, despite the subsidy, too expensive.

However, there were exceptions to these suggestions of inequality:

- Some interventions targeted female beneficiaries. The Start Network aimed its enriched flour distributions and sensitisation campaigns at women, especially those who were pregnant or lactating women. Similarly, women benefitted from the Start Network's sensitisation campaigns on hygiene and safe nutritional behaviours, covering topics such as breastfeeding and COVID-19 prevention measures.

[49] The 2020 information comes principally from Kimetrica (2020).

- Local committees selecting households to receive distributions from the Start Network seem to have been well gender-balanced, with the result that female-headed households should not have been disadvantaged in the distribution process. However, the proportion of households with a female head that received aid varied significantly by department/region.
- Start Network NGOs ensured gender-inclusiveness in all steps of programme implementation (needs assessment, targeting, and implementation).

5.3.5 Monitoring and Evaluation

There was only limited M&E information available on the 2015 distribution of support. In 2014/15, both the transparency of, and accountability for, resources mobilised and their use were lacking. In 2019/20, each FIP showed the breakdown of proposed expenditure between activities, and the agreed total payout was well-known in advance. In 2015, there was a lack of regular meetings at national level to monitor PNR implementation with all stakeholders, and a lack of joint field trips with partners to monitor the effectiveness of support. In 2020, monthly meetings of stakeholders took place but SECNSA often did not have the means to travel to the field to evaluate progress first-hand, though sometimes NGOs would share their transport for field trips. Instead, stakeholders' reports were often the best information available. Unlike the Start Network (whose M&E system involved: (i) M&E questionnaires that are filled out on a regular basis; (ii) Regular meeting of the staff in charge of M&E for information and exchanges of field based experiences; (iii) Distribution and Post distribution reports; and (iv) a monthly overall report) SECNSA does not have a dedicated M&E system that would allow real-time tracking of distributions or detailed statistics characterising success and failure at the end of the deliveries.

In 2015, it was considered a success that a few post-distribution monitoring surveys had taken place in two regions for targeted food distribution and in three departments for nutrition. In 2020, GoS issued reports on distributions achieved, while the Start Network undertook extensive M&E in order to establish which parts of the distribution process worked and how beneficiaries felt about targeting, delays, and the aid provided, and this involved tracking variables in the list of indicators that GoS and the Start Network both included in their respective FIPs.

The main information sources on the effectiveness of GoS's response in both 2015 and 2020 are the ARC-commissioned process evaluations.

For the Start Network, problems with the quality of the RNU data became evident in the field but investigations eliminated most anomalous households from the targeted sample taken from the RNU. Otherwise, the network's targeting went according to plan, including the participatory and inclusive fine-tuning of the RNU lists.

5.3.6 Issues in the implementation of aid distribution

A full comparison of the performance in implementing the distribution of food aid is not possible because of a lack of information about GoS distribution in 2020. In 2020, GoS supplied a standard ration package of rice, pasta, sugar, cooking oil, and soap, compared to only rice in 2015. The Start Network introduced cash transfers rather than food aid, which NGOs had previously supplied. GoS had originally included cash transfers in its plans but in the event this was not part of the FIP or the subsequent PNR.

Comparison of budgets

Table 6 shows the proposed budget for GoS's ARC payout in 2014, and the proposed budgets for its ARC payout in 2019, its augmented PNR in 2020, and the Start Network's ARC payout in 2019. Together, the four budgets show a wide range of approaches to drought relief. The GoS 2014 budget is relatively simple, assigning almost all the funds to food aid and subsidised livestock feed.[50] The comparable GoS budget for 2019 reduces the food aid and livestock feed proportions and introduces line items for malnutrition services and a contribution to the Calamity Fund.[51] The augmented PNR budget for 2020 (incorporating the funds from GoS's 2019 ARC payout) includes food aid, a combination of cash transfers and food vouchers, and a modest amount of livestock feed. The 2019 Start Network budget of 2019 put almost three-quarters of its budget into cash transfers, with 22% for malnutrition services and 5% to education and outreach for nutrition and (in the COVID-19 context) hygiene.

Table 6: Proposed budgets for ARC payouts and PNR, 2014 and 2019/20

Expenditure	GoS: PNR, 2014		GoS: ARC, 2019		GOS: PNR, 2020		Start Network: ARC, 2019	
	CFA m	% of total	CFA m	% of total	CFA m	% of total	CFA m	% of total
Food aid	5750	60	2750	47	69000	56		
Cash transfer & food vouchers					46700	38	4195	68
Subsidised livestock feed	3200	33	1000	17	4900	4		
Malnutrition services			450	8	1800	1	1264	21
Education for nutrition/hygiene							259	4
Calamity fund			1000	17				
Targeting			50	1				
Operating costs	76	1	660	11	100	0		
Balance of 2015 premium	530	6						
Indirect costs							430	7
Other					1200	1		
TOTAL	9556	100	5910	100	123,700	100	6148	100

Sources:
GoS PNR 2014 : République du Sénégal and ARC (2016)
GoS ARC 2019.
GoS PNR 2020: République du Sénégal and ARC (2019a)
Start Network ARC 2019: République du Sénégal and ARC (2019b)

In 2014, there was no dedicated ARC budget for nutrition because a decision by the President of the Republic resulted in the transfer of ARC funds for that year's PNR from nutrition to the

[50] 6% of the budget was paid back to ARC to pay off the unpaid balance of the 2015 drought insurance premium that remained due to the appreciation of the US dollar against the CFA franc.
[51] At 11%, operating costs are remarkably high, particularly compared to the corresponding cost of 1% in 2014. In a general sense, these four budgets' proposed expenditures for operating costs, targeting, indirect costs, and 'other' are unclear. Some of these terms must overlap. GoS apparently omitted targeting costs in its 2014 budget but targeting was done and the funds for targeting must have been taken from one or more other budget lines.

Opération Sauvetage du Bétail (OSB) for subsidised livestock feed. There is a parallel in the 2019 FIP. The original 2019 FIP, approved by the ARC board in December 2019, did not include the CFA 1.0 billion for the *Fonds de calamite*[52] that appeared in the presidential decree of 3 February 2020. That sum had earlier been allocated to OSB, along with the other CFA 1.0 billion that appears in the version shown in Table 6.

GoS's augmented PNR budget allocates 38% of the total to 'Cash transfers & food vouchers', but there is no reference to either cash transfers or food vouchers in accounts of the drought relief distributions and the evaluation team's understanding is that this was not implemented.[53]

The GoS 2019 FIP specified a distribution of 45 kg of rice per household distributed over three months. The Start Network 2019 FIP proposed cash distributions of CFA 5,000 per household member, up to a maximum of CFA 40,000. However, the pandemic and lockdown made a big difference to GoS's planning. The revised PNR[54] specified 100 kg of rice, 10 kg of sugar, and 10 litres of oil, probably tripling the calories of the household ration. The justification for this ration size is unclear. The Start Network implemented its FIP-specified cash distributions. These gave beneficiaries more choice in how to use each distribution, which led to a distinct majority preference for this form of distribution, as recorded in a post-distribution survey. They also had lower procurement and delivery costs.

After the two-month delay due to the lockdown, most of the Start Network's delivery of its cash took place in June and July 2020.

Issues in distribution

Food distribution: In 2014/15, the quantities of food (rice) distributed were not correlated to household size but were all of the same weight, designed for a household of nine members. While this would have been advantageous for households with fewer members, it was seen as a problem for large households, who risked having insufficient food per person. In 2020, MDCEST made a single delivery per household of a standardised ration: 100 kg sacks of rice, 10 kg boxes of pasta and of sugar, 10-litre bottles of cooking oil, and 18 pieces of soap. The focus on reaching the 1 million household target did not leave a lot of time for varying the ration size, so the problem raised in 2014 may have recurred in this context. The Start Network made cash transfers and did not deliver staple foods. It only delivered fortified flour, in much smaller quantities than MDCEST's food distributions.

In 2015, GoS strongly preferred the rice it distributed to be Senegalese rice, but it was difficult to obtain sufficient supplies of domestically produced rice. This requirement slowed down distributions, so it was relaxed. No such condition was attached to the rice used for GoS's 2020 PNR distributions, so there were no corresponding delays. In 2015, beneficiaries in some regions reported preferring millet or maize to rice, but consumer preferences were not reported to be a constraint on acceptability of the food provided in 2020.

In 2014, some suppliers delivered poor-quality rice, causing problems because GoS did not put in place a complaints mechanism. In addition, some suppliers gave short measures, which can be difficult to detect and to verify. Another problem was the delivery of rice to locations far from

[52] Vulnerable households are unlikely to benefit from the *Fonds de calamité*, which provide disaster relief to more affluent farmers who can obtain credit from the agricultural development bank, CNCAS, by waiving CNCAS loans
[53] This issue will be checked through discussions with stakeholders when reviewing this draft report.
[54] The evaluation team has not seen the revised PNR.

households, which caused additional expenses for beneficiaries. We do not know the extent to which these logistical problems applied to the GoS distribution of PNR rice in 2020, but the Start Network had problems obtaining enough flour from local millers (and the lockdown rules prevented trucking in flour from other regions). In other instances, flour quality was poor. The Start Network had the flexibility to substitute cash, and eventually did so. In 2014, there was no reference to market price tracking. In 2020, the Start Network checked market prices.

As a result of the impact of COVID-19, MDCEST was trying to distribute three times as much food per household to six times as many households as the GoS FIP had anticipated. This was reported by key informants to have affected the quality of targeting as well as posing challenges for effective management of logistics. The food was distributed to households in a single delivery, in the interests of efficiency. Some GoS rations were delivered to households that had already received rations – from GoS or from the Start Network – and some households received none. Key informants considered however that GoS's performance was good given the circumstances, while the Start Network was effective in communicating with GoS implementing agencies to limit poorly targeted deliveries, fostering effective collaboration.

Livestock feed: OSB is an annual operation that helps herd owners' ruminants through the lean season from April to July through subsidised sales of livestock feed. In 2014/15, OSB had an uptake of only 23% of the anticipated herd owners for its animal feed, despite a 41% subsidy. The income from the sales was used to fund livestock sector development. In 2014/15, the OSB component had no predefined targeting methodology and no process for identifying final beneficiaries. In 2019/20, herd owners with a membership card for a livestock owners' association, and/or a vaccination certificate, were able to buy the subsidised feed. The recipients did not have to be vulnerable as defined the RNU. The Kimetrica Process Evaluation reported that funds from the GoS ARC payout were combined with GoS COVID-19 Response Plan funds, enabling the Ministry to buy more feed at lower prices and to reach a larger number of beneficiaries. Distribution was completed by mid-August 2020. A total of 4,706 tonnes of cattle feed were bought and 3,411 tonnes were sold at prices that were 75% below the normal market price. However, no survey information is available to assess the characteristics of beneficiaries or impact of this distribution, which took place in departments with a fodder deficit and in transhumance zones.

6 Findings: Evidence on household effects

This chapter summarises evidence to answer the EQ: 'To what extent and how have payouts to government and the implementation of ARC CPs contributed to the protection of livelihoods and food security, and prevented asset loss, in Senegal?' Specifically, we attempt to answer three research questions around who benefit from the distributions; whether there are any particular characteristics that influence the extent to which households are able to reap the benefit from the support they have received; and whether the support is sufficient to prevent the households from resorting to negative coping mechanisms.

As described in section 3.5.3, our analysis draws on the data collected by Kimetrica as part of their process evaluation, and the data from the Start Network payout evaluation. We build on the findings from those studies and explore the potential further use of these datasets to examine the extent of ARC's contributions at household level. We first review their data and its limitations (in section 6.1). In section 6.2 we summarise the key findings reported in these two studies. These findings are then used to form the basis for our quantitative analysis, which provides further insights into the potential impacts by household characteristics and by the type of support received by households. Analysis was undertaken (as reported in annex section I.3.3) to assess the extent to which households were able to smooth their consumption, as compared with normal consumption levels, as a result of the support received, but the data available (particularly on prices) was insufficient for conclusions to be drawn.

6.1 Summary of evidence used

6.1.1 Evidence collected by Kimetrica[55]

Kimetrica's process audit report assesses 'how well and how closely the GoS and the Start Network Final Implementation Plans (FIPs) and related amendments were followed, using spot checks (an assessment of intervention quality and compliance through the use of sit visits), key informant interviews with local implementing partners and beneficiaries, reviews of distribution records, and potential direct observation of project activities' (Kimetrica, 2016). The process audits focus on operations, implementation, delivery of approved FIPs, programme reach, implementation quality, and beneficiary satisfaction. As part of this exercise, Kimetrica collected household-level data, which include information on household characteristics (e.g. household size, number of pregnant women, breastfeeding women, children aged between 6–59 months); whether household members have received assistance from the government or other organisations in the past six months; the type of assistance received; who was the provider of the assistance; the month/year that the first assistance/distribution was received; the frequency (how many times the distribution was received) of the assistance; the month/year of the last assistance; the type of assistance that the household would prefer; how the household was selected for the programme; whether the selection process was perceived to be fair and in what ways; several questions on the process of the distribution (e.g. how far did they have to travel to collect the food, what did they do with the distribution received?); and self-reporting outcome variables in terms of the effects the distribution have on the households' livelihoods.

[55] Additional detail is provided in Annex section H.1.

The Kimetrica household survey explored how beneficiaries of both the ARC and ARC Replica intervention perceived the implementation process.[56] The survey was based on ARC's Programme Audit Guidelines and was modified to be context-specific to the 2019 Senegal audit. The format used mostly dichotomous (yes/no) questions, simple rating, and straightforward numerical values (e.g. the quantity of relief items or cash received) to assess programme efficiency of operations and beneficiary satisfaction. The key sections included in the survey were the following:

- **Interview details**: the interviewer's and respondent's names, phone numbers, geographical locations (region/department), whether the respondent is the head of household, and the gender of the respondent.[57]
- **Descriptive statistics**: the household size, the number of pregnant women, the number of breastfeeding women, and the number of children aged 6–59 months).
- **Assistance received:** the assistance received (e.g. food, cash, seeds, etc.) in the last six months, the type of assistance received, who provided the assistance, the time/month/year that the respondent received the first/last distributions, the frequency of the distribution, and the most preferred type of assistance.
- **Targeting**: understanding how households were selected, and whether the selection was perceived as fair (why/why not).
- **Enrolment**: how households found out they were selected as beneficiaries; documentation needed to register for the programme; knowledge about (i) the objectives of the programme, (ii) which organisation was providing the assistance, (iii) what the households were entitled to, (iv) beneficiary selection criteria, and (v) how to provide feedback/lodge a complaint.
- **Implementation and perceptions** (this was asked for each type of support, i.e. food distribution, cash distribution, livestock feed subsidy, and awareness-raising and education campaign on nutrition and hygiene): the questions included the time it took to travel to the delivery site, the wait to collect the food, the amount received, the amount expected, whether the support arrived on time and in a good condition, what they did with the support, and whether the support had helped with the seven main outcome variables – averting suffering, meeting monthly food requirements, improving daily household food consumption, preventing the distress sale of livestock and other assets, preventing the migration of family members to cities in search of work, preventing the household from taking children out of school, and helping reduce debt.
- **Drought/COVID-19 impacts**: whether the household has been negatively affected by drought in the last 12 months, the degree of severity of the impact, the month and year in which the household started to be affected by the drought (only the month for COVID-19), and the way in which household had been affected by the drought/COVID-19.

The survey was conducted by phone between June and September 2020 with a final sample of 401 households in Diourbel, Kaffrine, Kolda, and Louga.[58]

[56] The survey was carried out between June and September. GoS's distributions were made between April and July and the Start Network did two rounds of distributions in June and July. Thus the survey started while the distributions were still taking place, but finished two months after the distributions were completed.

[57] The dataset as analysed by Kimetrica and shared with OPM was anonymised and did not include names or telephone numbers.

[58] The original target was 400 households: 150 households randomly selected from the Start Network beneficiaries, and 250 randomly selected from GoS beneficiaries. Kimetrica over-sampled by 10% (for a total 440), but some households had moved or were unavailable, leaving the final sample of 401 households.

6.1.2 Evidence collected by the Start Network[59]

The Start Network's payout evaluation is an internal evaluation that aims to assess 'the extent to which the ARC Replica pay-out was able to contribute to the protection of livelihoods (including prevention of asset loss) and food security for vulnerable households during lean season. The evaluation also looks at the wider effect of contingency planning and coordination processes associated with the pay-out. It is a theory-based design using both quantitative and qualitative methods to assess the effect of the pay-out through its causal pathways of supporting timely and effective action to drought, and towards influencing how agencies plan for and respond to drought' (Start Network, 2020).

The Start Network conducted **three rounds** of **independent monitoring (IM) survey**, in June, July, and August 2020 (this was first planned as involving face-to-face interviews but due to COVID-19 this was converted to phone-based interviews) with a randomised and representative sample of 850 beneficiaries per round (2,550 households in total) from the seven regions covered by the Start Network agencies on the assistance that they had received. The IM survey focused on self-reported household-level effects of the drought, as well as what effects the Start Network distributions might have made to mitigate negative outcomes in terms of food security and livelihood. The interviews were held a few weeks after the beneficiaries had received the assistance in order to give them sufficient time to assess the relevance and quality, and to report back on behaviours that were undertaken after they received the assistance. The questions included questions on the following:

- **Household demographics**: household size and composition, number of pregnant and lactating women, number of household members benefitting from cash transfers and from fortified flour, the main livelihood strategy, and other forms of assistance received.
- **Receipt of money**: frequency, amount, mode of transfer, whether the amount was sufficient to cover basic needs (why/why not), the preferred type of support, how they used the money, who decides how to use the money, problems encountered as a result of the support.
- **Education/awareness raising.**
- **Receipt of fortified flour**: the amount in kg, their perception of the quality of the flour, how they used the flour, whether they sold the flour, satisfaction with the system, etc.
- **Household food needs and dietary diversity**: meals eaten by different members of the household, including children and pregnant/lactating women, food groups.
- **Accountability**: whether the distributions were conducted in a transparent and fair manner; whether anyone had tried to scam, abuse, or blackmail the respondent in relation to the support they received, and whether they had to pay a fee, work, or render a service in order to be included in the programme or to receive the items.

6.1.3 Limitations of both datasets

The unprecedented effects of COVID-19 mean that it is not possible to conclusively attribute any change (particularly at household level) to the ARC and ARC Replica interventions specifically – entirely or even in part. This is exacerbated by the fact that GoS's COVID-19 response fund targeted some of the same communities, and even some of the same households, for in-kind

[59] Additional details are available in Annex section H.2.

support during a similar time to when ARC Replica distributions took place. It was also noted that although every attempt was made to produce a random and representative sample for all data collected as part of the Start Network's payout evaluation, there were some limitations in achieving this. The small size of the dataset for the Kimetrica process evaluation (not being designed for impact evaluation purposes) limits the precision of estimates. It would be useful to disaggregate at least between GoS- and Start-supported households, and potentially by other household characteristics (such as sex of household head and major livelihood sources on which data were collected). Both the Kimetrica and Start Network surveys could usefully provide more comprehensive information on the household sampling process, including sample frames and non-response. It is not clear from the documentation how representative the samples are, and if sampling weights should have been used in the analysis.

6.1.4 Other evidence used

In order to review the targeting processes of the ARC and ARC Replica, we have reviewed information about the RNU (but without having access to its data), as well as poverty measurements in Senegal. We have also drawn on a number of publications, including: a research brief on the RNU conducted by the International Policy Centre for Inclusive Growth (Ndiaye *et al*., 2019), the World Bank's poverty assessment (World Bank, 2015), a technical report on mapping the poor in Senegal by the World Bank and GoS (World Bank and ANSD, 2016), the 2021 Poverty and Equity Brief for Senegal by the World Bank, and the 2019 Demographic and Health Survey (ANSD, 2019). We note that poverty monitoring survey data was collected by ANSD in partnership with the World Bank, but we have not been able to access this.

6.2 Evidence on household impact

6.2.1 Who benefitted from the distributions and how does this vary across different types of households?

The average beneficiary households as reported in both surveys had around twelve members (compared to the planning assumption of eight) with more than two children under five. There were differences between the two surveys in terms of the percentage of male- or female-headed households and the Start Network households had more pregnant and lactating women, presumably reflecting different targeting processes for the fortified flour. The Kimetrica survey found a substantial number of households who received more than one type of support, while some others received none, which indicates targeting and distribution challenges. There is very little systematic information on those who did not benefit from support. This represents a serious gap in monitoring how well assistance is targeted and in understanding the true impact of the interventions, as well as what outcomes look like in the households that were not supported through this period.

Beneficiary households

The two surveys give some information about the characteristics of the beneficiaries. The evaluation team examined this, and also analysed how the outcomes reported by households varied with their characteristics, using both simple cross-tabulations and logistic regression models, as explained in Annexes I.2 and I.3.

As shown in Table 7, most of the households included in the Kimetrica sample reported that they were affected by both drought and COVID-19. Households had an average of 2.6 children aged 6–59 months and an average household size of around 12 members. This is substantially larger than that reported elsewhere (e.g. 8.1 from a national survey,[60] 8.5 from the 2019 Demographic and Health Survey (ANSD, 2019), and 9.62 from the technical report on poverty mapping by ANSD and the World Bank (World Bank and ANSD, 2019)). It is not clear if this is because of geographical differences, the effect of the targeting process in selecting larger households, or reporting issues. One-quarter of households had a pregnant woman in them, and a similar proportion had a lactating woman.

Over half of the households received food and around a third received cash. The types of support received varied across different regions. There were also large variations by region in the source of support reported by households (whether GoS, NGOs, or ARC), but since this was based on self-reporting data (the respondents were asked about the sources of support) and since it is unlikely that the respondents would have accurate information about who provided the support, one needs to be cautious in interpreting these data.

The evaluation team undertook a logistic regression analysis of the Kimetrica data on whether households reported being able to keep their children in school. This found (Table 7) that households who reported that they were not impacted by the drought were 3.7 times more likely to be able to keep children in school. The analysis also found that households that received at least two rounds of support were 7.6 times more likely to keep their children in school, compared to households that received only one round of support.

Table 7: Characteristics of the households who received support from ARC and ARC Replica by region (Kimetrica evaluation, N=401) [61]

Variables/region	Diourbel	Kaffrine	Kolda	Louga	Total/ average
Total obs.	*118*	*116*	*63*	*104*	*401*
Male head of household (%)	57.6	45.7	65.1	27.9	49.1
Female head of household (%)	42.4	54.3	34.9	72.1	50.9
Average household (HH) size	12.1	12.1	11.6	12	12.0
% HH with at least one pregnant woman	29.7	29.7	21.2	19.5	25.0
% HH with at least one lactating woman	27.4	31	16.8	24.8	25.0
Ave no. of children 6–59 months	2.94	2.41	2.59	2.54	2.6
% HH affected by drought	86.5	89.7	89.3	56.7	88.5
% HH self-reporting as negatively affected by COVID-19	82.4	94	94.6	100	92.8
Average number of distributions received	1.68	1.95	2.71	1.33	1.9
% of all HHs that reported receiving food*	27.1	97.4	14.3	73.1	57.4
% all HHs that reported receiving cash*	40.7	28.4	69.8	24.0	37.4
% all HHs that reported receiving flour*	15.3	0	6.3	16.3	9.7

[60] According to the *Pauvreté et Structure Familiale* survey, the average household size of poor household is 8.09 – see De Vreyer and Lambert (2020).
[61] Percentage of households in the total sample that received food/cash/and flour (food items here exclude flour).

Variables/region	Diourbel	Kaffrine	Kolda	Louga	Total/ average
% of all HHs that received any form of support	62.7	100	88.9	100	87.3

Note: *The same household could receive more than one type of support and thus the same household could be counted in each of these categories (N for receiving food = 222, N for receiving cash = 121, and N for receiving flour = 39); since other types of support were also reported, the percentage of households receiving any support may be larger than the sum of the percentage reporting any of the three types shown in the table.

Beneficiary households in the Start Network survey (Table 8) were similar to the Kimetrica sample in terms of average household size and the number of children under five (given the difference in age range). However, the percentages of male- and female-headed households were quite different, and the Start households had more pregnant and lactating women, presumably reflecting different targeting processes.

Table 8: Characteristics of the households who received support from the Start Network (Start Network payout evaluation, N=2555)

Variables/Region	Diourbel	Matam	St-Louis	Louga	Thiès	Kaffrine	Kolda	Total
Total obs./ave	361	346	364	341	380	381	382	**2555**
Male HH head (%)	71.5	54.6	54.7	77.1	52.9	71.4	66.5	**64**
Female HH head (%)	28.5	45.4	45.3	22.9	47.1	28.5	33.5	**36**
Average HH size	14.4	13.3	12.0	13.4	13.1	12.6	14.4	**13.3**
% HH with at least one pregnant woman	29.9	32.7	35.7	36.7	27.9	31.2	35.7	**32.8**
% HH with at least one lactating woman	64.3	68.5	79.1	68	63.3	65.6	71.5	**68.6**
Ave no. of children 0–59 months	3.2	3.1	3.1	3.3	2.7	2.9	3.3	**3.1**
% HHs that reported receiving cash	100	100	100	100	99.5	100	100	**99.9**
% HHs that reported receiving flour	78.9	0.6	40.9	53.1	28.9	0.3	0.5	**28.6**

The evaluation team also undertook a logistic regression analysis of whether beneficiary households reported having enough food to satisfy the needs of the household, using the Start Network survey data. The results showed that the amount of money received, whether enriched flour was received, price and income variations, other types of assistance received, and the region all have a statistically significant influence on the outcome variables (see Table 28). Specifically, households were significantly more likely to report having enough food if: they received larger cash transfers; they received additional assistance from another source; they received fortified flour; they reported an increase in income; or they reported stable or falling prices. Households with seven or more children were less likely to report having enough food in the household.

These results are intuitive. Having more children in the household makes it more difficult to cater for the household's needs in terms of food consumption, despite receiving the support from ARC Replica. Having more cash and having excess income help households sustain their needs. Our results confirm those presented in the Start Network payout evaluation report, although in that

report it is also mentioned that any effects of distributions on dietary diversity were short-lived. Most households relied on simple meals, consisting primarily of grains and legumes. When examining the number of meals consumed per day, the Start Network's results suggest that children, pregnant women, and nursing women seemed to benefit from the distributions. However, since each household could receive more than one distribution and/or type of support, as mentioned above, it is not possible to conclusively attribute the positive impact on food security to the ARC Replica intervention alone.

The Start Network report noted that the support was not received early enough to prevent households from needing to use negative coping strategies, although a reduction in the use of some coping strategies was observed (e.g. going a whole day without eating, children under 18 having to work, men in the household having to accept high-risk, socially degrading, or exploitative jobs).

Targeting and non-beneficiary households

Section 5.3.3 outlined the improvements to the plans for identifying beneficiaries compared with 2015. The Start Network is reported to have largely used the approach envisaged, while the (much larger) government distribution did not. A number of problems in the RNU database, used in the Start Network targeting process, have also been identified, including: the need for clearer documentation of the data and analysis; the risks of errors of inclusion and exclusion; problems of inaccurate and outdated data; the lack of a systematic process for updating the database; and the limited information that is collected, including around food security indicators (see Annex G). Overall, the poverty and vulnerability criteria used for selecting beneficiary households should be clearly explained, while highlighting limitations and how they can be dealt with.

As reported above, the Kimetrica survey found that some respondents reported receiving more than one distribution, while others reported receiving none. This suggests there were some problems in targeting the assistance. Kimetrica reported that the large majority (92%) of beneficiaries reported that the beneficiary selection process was fair. The extent of the respondents' knowledge of the selection process is unclear, however, and it is perhaps not surprising that those who received support considered the process to be fair. For detailed analysis of the characteristics of the beneficiaries see Annex I.3.1.

6.2.2 To what extent have the distributions supported the livelihoods of the households? How well did the support match the needs?

Almost all beneficiaries[62] reported that the support helped them to avoid negative outcomes, and to assist with meeting food consumption requirements and improving the quality of food. Cash that was left over was used to pay off debts and to avoid other negative coping strategies. The distributions are likely to have prevented many households from having to resort to more extreme negative coping strategies, including buying food on credit or borrowing money to buy food, children working, and men undertaking high-risk and socially degrading or exploitative jobs. The Kimetrica process evaluation survey found that a high proportion of households (90%) reported that the main distributions (cash or food) helped prevent the distress sale of livestock and other assets.

[62] See Table 9.

The cash received under the Start Network support also helped prevent many households from having to resort to more extreme negative coping strategies. However, the effect of the support was limited and short-term. A majority of households reported having to use one or more of the coping strategies including borrowing to purchase food, skipping meals. Most respondents reported that the amount of cash received was insufficient to meet their household's basic needs, even just for a few weeks. While the total cash transfer was capped for a maximum of eight members per household, most households were larger than this (with an average household size of twelve). This does not seem to have resulted in their generally reporting worse outcomes, though households with seven or more children were found to be less likely to report having enough food in the household.

Households were significantly more likely to report having enough food if: they received larger cash transfers; they received additional assistance from another source; and they received fortified flour.

The quantity of rice provided may have lasted only a month or so for the average size of household reported in the surveys (twelve members). Flour distributions were constrained by the COVID-19-related restrictions, which made the procurement of quality flour a challenge. Most of the flour distributions by the Start Network were replaced by cash distributions.

There is a trade-off between the amounts transferred to beneficiary households and the total number of households that can receive support. Since we know very little about the households that did not receive support, it is difficult to know if the right balance was struck, and/or if coverage and total resources needed to be much higher.

The Start Network evaluation found that the selected support window generally aligned with when households were preparing for the lean season, although an earlier window may have been preferable. Beneficiaries generally reported that they received the money early enough, though some households also reported resorting to a range of coping strategies. GoS distributions, on a much larger scale, were undertaken slightly later than the Start Network distributions, starting in August 2020, suggesting that they will have come too late for some households. However, insufficient information is available to confirm this.

Context and implications for the support required by households

The Start Network report found that common strategies used by households to prepare for the lean season include taking out loans or buying food on credit, selling livestock, and engaging in a range of non-agricultural activities. The COVID-19 pandemic disrupted the primary strategies used by households to prepare for the lean season. The closure of *loumas* (weekly markets) in particular was cited by a number of respondents as particularly detrimental to household income, as it prevented households from being able to sell market garden produce, livestock, or items produced through skilled or unskilled non-agricultural labour (e.g. shoes, baskets, firewood). Households who depended on remittances from relatives working in other parts of the country or abroad also found their income strategies affected. The Start Network support assisted households to manage their general food security challenges, rather than specifically having an anticipatory effect ahead of drought-related challenges, as was originally intended.

Reported effects on households

From the Kimetrica sample of respondents of the household survey (401 households), it was reported that 351 households received **various kinds of assistance,** including flour and cash from the ARC-funded intervention (from ARC Replica) and rice from the ARC intervention, and other food items from the 2020 PNR. Of the 401 households surveyed, 177 (41%) respondents reported receiving more than one distribution. By contrast, 51 respondents (13%) reported having received no assistance, mostly concentrated in some specific regions, but the survey did not involve detailed examination of the operation in practice of targeting that might explain this.

Kimetrica asked survey respondents about the distributions and the effect on their households. The respondents appeared to be satisfied with the distributions (92% of the 351 households who received the support) and reported that the food and cash distribution strengthened their household's capacity to cope by helping them avoid resorting to extreme coping strategies, such as selling productive livestock.[63] Table 9 shows the self-reported outcomes by type of assistance. It is worth noting that each household could receive more than one type of assistance (e.g. food and cash). The respondents, who received food support, reported that the distribution helped avert suffering (although the definition of this is unclear), significantly helped them meet their monthly food requirements, improved household food consumption, and reduced debt. To a slightly lesser extent, the food received was reported to have helped prevent distress sale of livestock and assets, to have helped prevent family members migrating to other cities in search of work, and to have helped keep their children in school. Similar results were reported for those who received cash and flour (although only a small number of households received flour). The most commonly reported positive outcomes overall were around helping with food consumption and reducing debt, as well as averting suffering. Since households could receive more than one type of support, it is impossible to clearly distinguish the impact of receiving only food, or only cash or only flour, on these outcome variables.

Table 9: Outcomes by types of support (N = 382*), proportion of households who received support saying 'yes' to experiencing positive outcomes

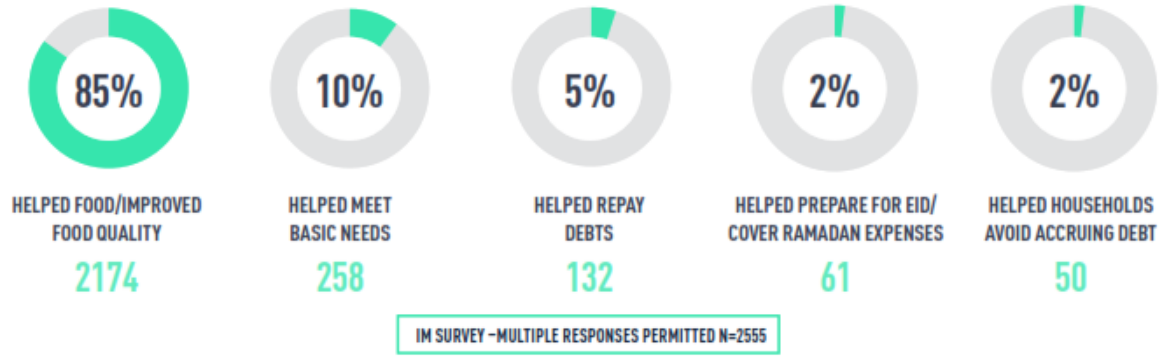
Outcome (% of HHs)	Type of support		
	Food	Cash	Flour
Avert suffering	100.0	98.3	100.0
Helped meet monthly food requirements	99.1	98.3	97.4
Helped improve household food consumption	99.1	91.7	87.2
Prevented the distress sale of livestock and other assets	89.6	89.3	74.4
Prevented migration of family members to cities in search of work	73.0	81.8	66.7
Prevented the household from taking children out of school	77.9	78.5	59.0
Helped reduce debt	97.7	99.2	97.4
Total observations	222	121	39

Note: Some households received more than one type of support and thus the total N includes some double-countings.

[63] Only a small proportion of the sample received livestock feed so it was difficult to gauge the effect of this intervention at the household level.

The Start Network evaluation found that, of the total sample of respondents, 85% reported that the cash transfer mainly helped them deal with food insecurity and helped improve food quality, rather than resorting to other coping strategies (e.g. helped meet basic needs (10%), helped repay debt (5%), helped prepare for Eid/cover Ramadan expenses (2%), helped households avoid accruing debt (2%), Figure 7). Respondents reported spending most of the cash on food and this was the case in all regions that were surveyed. The first distribution was primarily spent on buying food and repaying debt, while the subsequent distribution was spent on a wider range of activities.

Figure 7: What changes has your household made since receiving cash support?



Source: Start Network (2020)

The Start Network evaluation reported on a number of other key household outcome indicators:

- **Number of meals consumed**: Given the focus of the ARC Replica's nutritional support on pregnant women, nursing women, and children under five years old, the survey focused on the number of meals eaten by these specific groups. The results suggested that most respondents in these groups were able to consume three meals a day (on average 91% for children under five years old and 88% for pregnant/nursing women across the three rounds of the survey).[64]
- **Household Dietary Diversity Score (HDDS)**: The Start Network also calculated the HDDS, which reflects a household's access to a variety of foods and provides a measure of the quality of a household's diet. Overall, the average HDDS across all regions in June, July, and August (when the surveys took place) was low. Most supported households depended on meals made up of only grains (mostly rice and millet), legumes (mostly peanuts), sugar, and fats/oil. There was also substantial variation in average HDDS by region, with Diourbel, Kolda, and Saint-Louis experiencing a decrease in HDDS.
- **Use of negative coping strategies**: While the distributions may have prevented many households from having to resort to more extreme negative coping strategies, their effect was limited and short-term. The respondents were asked if they had used one or more of a series of negative coping strategies to get food or money to buy food within the previous 30 days. In round one (June) of the survey the most widespread coping strategies were (out of 13 coping strategies): (i) buying food on credit or borrowing money to buy food (60% of the respondents); (ii) reducing the number of meals eaten in a day/skipping meals (41%); (iii) going a whole day without eating (21%); (iv) children under the age of 18 having to work to

[64] For all these findings, it was not possible to conclusively attribute positive effects to ARC Replica interventions, due to the lack of a relevant counterfactual, as well as the fact that GoS was distributing in-kind support in response to COVID-19 during approximately the same time period. Some households received support from both ARC Replica and GoS's COVID-19 fund.

provide household resources (18%); and (v) one or more men in the household accepting high-risk, socially degrading jobs or exploitative jobs (18%). The Start Network evaluation concluded that the support was not received early enough to prevent all households from needing to use negative coping strategies. However, it was reported that there was a reduction in the percentage of respondents who reported using each coping strategy, except skipping meals, between June and August (1% reduction for buying food on credit or borrowing money to buy food; 13% reduction on having children under the age of 18 worked to provide household resources; 19% reduction on going a whole day without eating;10% reduction on one or more men in the household accepting high-risk, socially degrading or exploitative jobs) . Given that this period represented the height of the lean season, the Start Network suggested that this was an indication of a 'very positive finding'.

Overall, both Kimetrica and the Start Network's findings suggest that the distributions mainly helped households with their food consumption/requirement and the quality of their food. The Kimetrica survey found much higher levels of households reporting avoiding other negative outcomes, which may reflect the way the question was formulated, the provision of food aid, or some other factor.[65]

A clear common finding is that households used the distributions for food consumption and food security first, regardless of what they received. What was left (in terms of cash) was used to pay off debt and then to avoid other negative coping strategies.

Adequacy of support

The Kimetrica report states that from mid-April GoS started implementing COVID-19 food security responses, comprising food distribution and livestock feed, which subsumed the ARC intervention. The plan for the beneficiary package consisted of 100 kg of rice, and 10 kg of soap, sugar, oil, and pasta, worth approximately €100. We do not have full information on the operational arrangements of this intervention. For the Start Network, cash transfers were planned to be made to each beneficiary household through three rounds of distribution in March, April, and May 2020, in order to support households to prepare for the peak of the leaning season during June and July 2020. However, due to COVID-19, the first round of the distribution was delayed to May.

The Start Network evaluation found that the payout's focus on cash distributions and fortified flour was consistent with supporting preparations for the lean season, ensuring households were in the best possible position to deal with drought impacts. However, most respondents reported that the amount of cash received was insufficient to meet their household's basic needs, even for just a few weeks. This perception varied somewhat between regions but was broadly shared among respondents. It was reported that this was due to the fact that households faced multiple challenges, large household size, increased food prices, and sharing support with other households. When asked how much (per distribution) would have been sufficient to meet the household's basic needs, the figures ranged between CFA 80,000 and 120,000 (US$ 145 – US$ 217) per month, which is two to three times larger than the maximum of CFA 40,000 CFA (US$ 72) that they received from the intervention. This would have enabled households to focus on longer-term preparation activities, such as buying food to store for later use or buying seeds and fertiliser to increase their next harvest.

[65] In particular, it seems unlikely that nearly all households would have suffered most of the negative outcomes in the absence of the support, particularly since the total support received by each household was limited.

Supported households received a total of CFA 5,000 (US$ 9) per household member for up to eight household members per distribution. The most a household could receive was CFA 40,000 (US$ 72) per monthly distribution, or CFA 120,000 (US$ 216) in total.[66] The average household size in the Start survey data is 13, varying between 12 and 14 by region. This is similar to the average reported in the Kimetrica survey. Since the total amount a household could receive was capped well below the size of many households, the per capita value of the transfer varies a great deal and falls off very substantially for larger households, from around CFA 23,000 per capita for the smallest households to only around CFA 6,000 for the largest (Table 10). This may be part of the reason that households reported that the cash was insufficient.

Table 10: Amount of cash received per household size, Start Network survey

HH size	% of HHs	US$ 0–60 (%)	US$ 61–120 (%)	US$ 121–200 (%)	US$ 201– 240 (%)	US$ 241+ (%)	Mean total amount received by HH (CFA)	Mean per capita amount received (CFA)	N
1-5	2.5	2.4	12.2	36.6	39	9.8	94,500	23,162	41
6-10	37.1	0.6	3.2	13.7	49.6	32.8	115,574	13,763	619
11-15	32.7	0.7	0.9	7.0	50.6	40.7	122,041	9,520	545
16+	27.8	0.2	1.1	5.6	59.6	33.5	129,450	5,986	463
Total		**0.6**	**2.1**	**9.8**	**52.5**	**35**	**118,850**	**10,449**	**1,668**

Source: Evaluation team analysis of Start Network survey data, July and August Survey Rounds. Note that this table presents data only for the July and August survey rounds, when respondents had generally received their full payments.

Despite the lower per capita value of the transfer for larger households, an analysis of outcomes by household size for the Kimetrica data does not show any clear relationship (see Annex I.3, though the sample size is small). A regression analysis of the Start Network data undertaken by the evaluation team does not find household size to be a significant determinant of the outcome analysed (having enough food in the house), although households with large numbers of children (>7) were more likely to report not having enough food (see Annex I.3).

The evaluation team also looked at the survey question which asked Start Network respondents whether the price of basic food over the past month had increased: 68.8% reported that it had increased, which could partly explain why the amount of cash received may not have been sufficient. The regression analysis also found that households were significantly more likely to report having enough food if: they received larger cash transfers; they received additional assistance from another source; they received fortified flour; they reported an increase in income; or they reported stable or falling prices. This all suggests that the value of the transfer was insufficient for some households.

A comparison of the quantity of rice received with typical household consumption levels (see Section 6.2.2) suggests that the food package would last a typical household a little over one month. Kimetrica recommended that additional food items, such as oil and sugar, could be added to the current food basket to improve nutritional security at household levels (Kimetrica, 2020).

[66] In some cases, the amount received per distribution was slightly higher, to account for fortified flour no longer being distributed.

In terms of the type of assistance preferred, 46% of respondents in the Kimetrica survey reported preferring cash. There seems to have been no significant difference between male and female respondents in terms of the type of assistance preferred – most preferred cash as it would allow them to meet their immediate needs and they would be able to choose how to spend it. The Start Network survey found that most respondents reported that fortified flour received was useful, but they also indicated that they would prefer food vouchers, other types of food, and/or fodder/livestock feed.

Timeliness of support

The Start Network evaluation found that the selected support window generally aligned with when households prepared for the lean season, although an earlier window may have been preferable. There is variation in terms of when households are likely to enter the lean season: some households enter the lean season before April, while others face the most risk during August–September. The April–June support window selected for the 2020 payout in Senegal broadly matches with when households prepare for the lean season, but it was suggested that support beginning even earlier – coinciding with the end of the rainfed harvest during December/January – would have been preferable for households. Respondents generally reported that they received the money early enough. However, many vulnerable households do not specifically prepare for the lean season, but instead rely on several different agricultural and/non-agricultural income-generating activities, depending on the season, which was made more difficult by the COVID-19 epidemic.

GoS distributions, on a much larger scale, were undertaken slightly later than the Start Network distributions, starting in August, suggesting they will have come too late for some households.

7 Conclusions, lessons, and recommendations

7.1 Conclusions

7.1.1 Overall assessment of the household impact

Senegal's engagement with ARC contributed to the country being better placed to identify and respond to the emerging threat of drought during 2019 than it had been for earlier negative shocks. Based on lessons from the 2014/15 drought and accompanying ARC payout, and using capacity that had been developed, the FIPs prepared in response to the 2019 drought and ARC payouts represented significant improvements, including through the targeting approaches they envisaged. This was the result of the strengthening of capacity for operational planning and early warning, and engagement with the Start Network as the ARC Replica partner (which improved coordination within the NGO community and between NGOs and GoS), as well as the predictable provision of insurance payouts in December 2019.

Delays to the release of ARC funds from the GoS Treasury, as had also happened in 2015, were a factor in the late implementation of the response to the drought. Before the release of funds, the onset of COVID-19 in March 2020 radically changed the context in terms of both the scale and nature of the food security and livelihoods protection problems facing the country. The FIPs developed to use the ARC insurance payouts to address localised drought-related food insecurity were incorporated into (for GoS) or coordinated with (Start Network) the PNR through which GoS, with substantial additional external funding, provided support to address the shocks to livelihoods resulting from movement and contact restrictions to contain the spread of COVID-19.

There is evidence that the cash transfer helped the poorest households to avoid drastic coping strategies which could have a long lasting impact on their livelihoods, while in the least affected areas, households were able to increase their assets and food sources. While the level of support received was relatively limited and short-term, the evidence is that it achieved its objectives of reducing the extent to which households had to resort to negative coping strategies that were likely to have long-term effects on their livelihoods and assets. In the Kimetrica survey, 90% of households reported that the main distributions (of cash or food) helped prevent the distress sale of livestock and other assets.

The April–June support window selected for the 2020 payout in Senegal broadly matches the period when agricultural (but not pastoral) households prepare for the lean season, but this was not sufficient to prevent all negative coping strategies, and earlier receipt of support (at the time of harvest in December/January) would have been preferred by some households.

The dependence on retrospective reporting by beneficiary households, and the absence of any survey information from households who were not beneficiaries of some part of the support, is a major constraint on drawing firm, empirically-based conclusions about its impact. It is not possible to assess how effectively the support provided reached the households most in need, or to compare the characteristics and coping strategies of beneficiary and non-beneficiary households and to establish, for example, whether particular groups of vulnerable households were excluded from support.

7.1.2 The effectiveness of response and ARC's contribution to building capacity

Effectiveness of response

In addition to the provision of resources from insurance payouts, ARC's engagement with Senegal has contributed to strengthening GoS capacity for early warning and planning, while the ARC Replica initiative has improved coordination in the planning and delivery of assistance among major NGOs, and between GoS and NGOs collectively. The funding of the Start Network through ARC Replica has also strengthened ARV customisation and encouraged innovation, including through a stronger approach to M&E, generating lessons that can be applied in the future by GoS. The process evaluations commissioned by ARC have also been valuable sources of evidence and lessons about the effectiveness of relief delivery though information is not yet available on how this information may have been used by GoS and other stakeholders. While ARC's payout in 2019 did not directly lead to the leveraging of any significant additional resources, the existence of the FIP and the initiatives to improve planning and targeting that ARC had supported may have contributed to the process of PNR development and the securing of funding for it to address the economic impact of COVID-19. However, the evaluation study has not found direct evidence of this.

While the FIPs provided a clear statement of objectives for the use of resources from the ARC payout, it is not possible to provide an assessment of the extent to which the overall objectives of support provided were achieved against these objectives, because in the event the use of the ARC payout was integrated into the 2020 PNR which was dominated by the response to the impact of COVID-19.

As in 2015, there were significant delays in releasing ARC funds for use once they had been provided, and the model of household targeting set out in the GoS FIP was not implemented in practice. The operational planning process had envisaged the use of cash transfers by GoS but this did not form part of the FIP, nor was it in the event implemented as part of the revised PNR. Even had the onset of COVID-19 not radically changed the context for the provision of relief, it is unlikely that the target of ensuring ARC (and ARC Replica) funds were used to provide relief within 120 days of receipt would have been met.

The ARC Replica arrangement with Start Network has contributed to a more rapid and coordinated response by NGOs, including much improving the effectiveness of collaboration with GoS. This positive experience suggests that the ARC Replica arrangement may yield substantial benefits, though a firmer judgement about this will require reviewing the range of experience in other countries.

Continuing challenges

While there is clear evidence from this study that Senegal's engagement with ARC has contributed to improved DRM capacity and response, there are several aspects where weaknesses remain or that may pose challenges for the ARC model:

1. Timing targets for the use of resources provided through ARC payouts to GoS were not met, and probably would not have been met even without the COVID-19 pandemic, while there were also delays in finalising the FIPs as part of the process of securing payouts because of the need for data from the CH. Although the need to streamline the process for authorising the release of funds from the ARC payout was identified following the 2015 experience, similar delays occurred in 2020. These repeated delays pose challenges for

part of the rationale for the ARC arrangement – to ensure rapid availability of funding – and suggest that this objective was not prioritised by GoS.

2. While DRM capacity in GoS has been built through training and to meet the requirements of ARC processes, the extent to which this capacity can be sustained without continuing ARC Agency support remains to be established. In addition, as discussed in section 5.1.2, key informants noted that the organisational arrangements for the ARC Steering Committee need to be re-established following the abolition of the post of Prime Minister, and that there is no GoS budget provision for the TWG.

3. While Senegal has been committed to ARC (and has funded its insurance payments with GoS resources), it did not make its 2018 payment (until this was deducted from the 2019 payout), nor did it make an insurance policy payment in 2020. This suggests that the value to GoS of the insurance provided through ARC may be questionable.

4. There remain significant weaknesses in the M&E data available to assess the results of GoS support provided. In part this reflects the scale and rapid onset of the COVID-19 crisis which posed challenges for effective M&E, but it also suggests a low priority being placed by GoS on M&E. The data available for analysis of household impact used for this study was largely dependent on ARC – either through the Kimetrica Process Evaluation or the Start Network's evaluation activities. While relevant secondary data is available from GoS sources, it is difficult for researchers to access this, and it is not apparent that it is being used effectively to assess the results of DRM response or to learn lessons for the future.

7.1.3 Evidence on the ARC ToC

In relation to the ARC ToC, as set out in Section 3.3, this study has shown that positive changes have occurred in Senegal along both Pathway 1 (supporting timely and effective response) and Pathway 2 (influencing policy and practice of member states). The evidence is summarised in the Contribution Analysis Matrix presented in Table 11, which draws a distinction between an "effectiveness" rating (how far the Theory of Change has held to date) and a "sustainability" rating (which considers the likelihood that key assumptions will hold in the future).

In general the ratings are positive, with evidence that progress has been made along each of the ToC links at the effectiveness level (green or green/amber ratings with the latter indicating some challenges). There is clear evidence that GoS capacity for effective response to climate-related shocks has improved (though some elements of the operational plan were not fully reflected in the FIP) and even though the impact of COVID-19 radically changed the context of implementation and was far greater than the initial impact of the drought. Limitations (leading to a green-amber rather than green rating) relate in particular to the lack of progress in strengthening national M&E systems in support of DRM (particularly in relation to effective targeting), the failure to prevent a repeat of delays in approving the release of funds from the ARC payout, and evidence of some limitations in the timing and composition of the support provided to households.

Challenges relate to sustainability of the capacity developed, including the role of continuing ARC Agency support, the unresolved organisational and financing issues about the TWG, and whether the GoS will continue to regard the purchase of insurance through the ARC arrangement as cost effective in the future.

Table 11: Contribution Analysis Matrix for Senegal

#	Element of ToC	Areas of progress	Challenges	Rating: Effectiveness	Rating: Sustainability
Pathway 1: Supporting timely and effective response					
STC1	Improved government understanding and technical capacity:	There is clear evidence of strengthened GoS understanding and technical capacity for DRM through the TWG and its sub-groups, to which ARC has contributed through its capacity development support, experience sharing, and the regular processes related to forecasting and operational planning that have been put in place as part of the insurance arrangement.	The sustainability of this capacity without continuing support (and with uncertainties about future financing of the TWG and the organisational location of the ARC Steering Committee within government) remains to be established. The ARV is being used for analytical purposes but the CH is considered to better meet government needs. The fact that ARV data was required for ARC approval and CH data required for government planning led to delays in finalising the FIP.	Green/Amber	Amber
STC2	Contingency plans and insurance contracts in place	Operational plans have been prepared and have improved in quality over time. Insurance contracts have been taken out in most but not all years.	There were significant divergences between the latest operational plan before the 2019 payout and the FIP prepared before the impact of COVID-19. GoS had not paid its insurance premium on time in 2018 and also did not make a premium payment in 2020 as a result of the worsening of the terms on offer and the short notice provided of changes in the parameters for the insurance policies.	Green/Amber	Amber
INT1	Effective and timely implementation of contingency plans	The ARC process evaluation and other evidence suggests that in general support was provided effectively and in a timely fashion though targets for the time between the approval of funding and the delivery of support were not met.	There were delays in the implementation of plans in both 2015 and 2020, caused by delays in the release by the GoS Treasury of funding from ARC payouts, and in 2020 by the onset of the COVID-19 crisis and the incorporation of the FIP within the revised PNR. There remain challenges about the appropriateness of the support package provided (for households of different sizes) and the effectiveness of targeting. Repeat of delays in releasing funds suggests this objective may not be a priority for GoS.	Green/Amber	Insufficient Evidence

#	Element of ToC	Areas of progress	Challenges	Rating: Effectiveness	Rating: Sustainability
INT2	Vulnerable households covered by ARC insurance reduce their loss of assets and livelihoods in the event of a natural disaster	There is evidence that livelihoods were protected and that negative coping strategies were to some extent (but not entirely) mitigated as a result of the support provided to households.	Some evidence of households resorting to negative coping strategies. Information available is not sufficient to make a full or disaggregated assessment of impact, particularly to assess the extent to which targeting was effective in reaching the most vulnerable households.	Green/Amber	Insufficient Evidence
LTC1	Senegal is better able to anticipate, plan, finance, and respond to climate-related disasters in a timely, effective manner	Senegal's capacity in each of these areas has improved, with evidence that ARC has contributed to the positive changes that have occurred. An important element of this improvement has related to the role of the Start Network as the ARC Replica partner, and the improved coordination of NGO response.	Continuing weaknesses in national M&E information (including information to guide effective targeting) to enable assessment of effectiveness of response and to learn lessons.	Green/Amber	Green/Amber
Pathway 2: Influencing policy and practice of member states					
STC3	Improved dialogue and peer-to-peer learning	There has been evidence of peer-to-peer learning to the benefit of countries that have learned from Senegal's experience in risk modelling. Internally, dialogue and learning appears to have improved as a result of both the TWG structure and the improved and more structured relationships with NGOs that have resulted from ARC Replica.	Long-term organisational and financing arrangements for the TWG remain to be established.	Green	Green/Amber

#	Element of ToC	Areas of progress	Challenges	Rating: Effectiveness	Rating: Sustainability
INT3	Increased government ownership of process: ARC is embedded into national budgets and plans, with a strategy to finance premiums	There was evidence of more proactive GoS leadership of the response to the crisis of 2019/20 compared to 2014/15. The ARC premium and insurance payouts have been incorporated in the national budget and have been financed from GoS's own resources.	Insurance premium payments were not made in 2018 or 2020, suggesting GoS may decide ARC premiums are not cost effective. Funding of the TWG is not embedded in the budget.	Green/Amber	Amber

Key:
Green: evidence suggests (for the effectiveness rating) that positive progress is being made in line with the ToC causal pathways, and underlying assumptions are holding as valid and accurate. For the sustainability rating, it is likely that this progress will be maintained.[67]
Green / Amber: evidence suggests considerable progress is being made in line with the ToC causal pathways, but there is evidence of minor challenges and / or concerns that underlying assumptions may not hold.
Amber: evidence suggests some progress is being made in line with the ToC causal pathways but with challenges, and underlying assumptions are tenuous without sufficient evidence to confirm or refute as valid and accurate.
Amber / Red: evidence suggests less progress is being made than expected, with major challenges and some evidence that underlying assumptions are not holding.
Red: evidence suggests little to no progress is being made in line with the ToC causal pathways and significant challenges are noted, and underlying assumptions appear tenuous and are not holding as valid and accurate.
Grey: insufficient evidence at this stage in the evaluation to make a judgement on progress or assumptions.

[67] The same distinction between the effectiveness rating relating to experience to date, and the sustainability rating relating to future prospects holds for all the ratings levels.

7.1.4 Implications for monitoring and evaluating disaster response

Little progress was made between 2014/15 and 2019/20 in strengthening the national M&E system for DRM – with the important exception of the approach to M&E introduced by the Start Network. The only data that was available to make even limited quantitative judgements about household effects came from the Start Network M&E system and from the Kimetrica Process Evaluation. No data was available from national (GoS) sources. While the implementation report on the PNR provides details on the numbers of beneficiaries, and reviews lessons about operational effectiveness and challenges encountered, it is not possible to assess the effectiveness of targeting, and for example whether there were any groups who were not effectively reached by the support provided.

The study points to the need for a strengthening of the GoS M&E system, and suggests that greater attention should be paid by ARC Agency and donors and other regional and international agencies to encouraging the strengthening of national M&E systems for DRM. What is practical and useful to implement (in terms of capacity and resource requirements) will differ according to the national context, and it is unlikely to be appropriate in general to aim to carry out a full quantitative impact evaluation. However, it will certainly be desirable to have at least a baseline dataset for beneficiary households, so that a before-and-after comparison can be made. This would require pre-distribution survey data. The poverty and vulnerability criteria used for selecting beneficiary households should be clearly explained, while highlighting limitations and how they can be dealt with. Administrative or survey data should be used to compare the characteristics of households who are included in the distributions and those who are not, to assess the effectiveness of targeting in reaching the most in need.

Where it is considered appropriate and feasible to make a robust quantitative assessment of impact, surveys should be carried out with both beneficiaries and non-beneficiaries, so that it is possible to compare the beneficiaries of the intervention against a comparison group who share similar characteristics as those who received the intervention, using quasi-experimental technique if a randomised controlled trial is not possible. If the aim is to provide the support to all poor and vulnerable households, a step-wedge design could be used, in which the intervention is rolled out to a subset of the beneficiaries in each time period. Such a method ensures that all households who are in need are able to receive the support, while ensuring that a comparison group exists for each time period, and thus the impact of the intervention can be assessed (Centre for Evaluation, no date). An alternative would be to make use of statistical matching techniques. While resource availability and other factors (such as speed of onset) may restrict what it is feasible to do in any given case, a coordinated and strategic national response to assessing household impact should be considered as part of a wider M&E strategy for DRM.

7.1.5 Implications for the ARC evaluation

Assessing the contribution of ARC support

In relation to assessing the contribution of ARC's support (as opposed to the effectiveness of the overall national response), it is important to define an appropriate counterfactual. This would not in general be a situation where no disaster relief support was provided (which is the appropriate counterfactual for assessing a national response) but one where the national response took place without the use of ARC insurance (either the paying of premiums or the receipt of payouts), or the capacity development support that ARC has provided. While household impact evidence is clearly

relevant to this (for instance, to help understand whether capacity developed with ARC support has helped to make targeting or delivery more effective), the main questions about the extent to which ARC has effectively contributed to strengthening the DRM system only partly depend on this type of evidence. As has been done in this study, it is necessary to examine the elements of the national DRM system, and the specific activities that ARC has carried out, and to assess how these activities may have contributed to DRM system development. The assessment of ARC's contribution to financing is conceptually more difficult to make (including in situations where no insurance payment has been triggered) since the counterfactual depends on a hypothetical assessment of how drought response would have been financed in the absence of the insurance arrangement.

Lessons from the pilot country case study

The evaluation design set out in the ARC Evaluation Inception Report is a theory-based impact evaluation approach that involves collecting information to test the Theory of Change in different countries and contexts, and to use this evidence to develop a Contribution Analysis in order to assess the extent to which ARC has contributed to improving DRM response within its region of operation. This study has been a pilot for the approach for country case studies during the "impact" phase of the ARC Evaluation. The following lessons can be drawn from the pilot:

1. The original intention, as set out in the Inception Report, had been to develop a participatory impact assessment (PIA) methodology as a core part of the case study approach for the impact phase. However, it is clear that in countries that have received ARC payouts, the Process Evaluations that ARC is commissioning overlap substantially with the envisaged PIA approach.

2. The approach and instruments developed for the assessment of the development of DRM capacity and ARC's contribution to it proved to be effective, though a more formally structured approach to the definition and measurement of DRM capacity should be developed.

3. Obtaining a clearer understanding of the conditions under which the ToC holds, and what underlying assumptions may fail to be realised in particular circumstances, will require examination of a wider range of national experiences (and not just of cases where insurance payouts have been made).

4. The approach to assessing the contribution to finance should not attempt to assess macroeconomic impact since this is not an objective of ARC support but should focus on examining (a) the financing needs and the extent to which there were met by (b) ARC payouts, and (c) other sources of funding including any that ARC may have catalysed.

5. It is important to distinguish assessing the impact of ARC on the government's drought response from assessing the impact of the government's drought response on household welfare. The focus of the evaluation is on the former, although findings on the latter may provide information that is useful to it. While quantitative information on household level effects and other aspects of the performance of the national disaster response to which ARC has contributed (e.g. the effectiveness of targeting) is potentially valuable for understanding results achieved and challenges encountered in the government's drought response, it is beyond the resources and scope of the ARC Evaluation to collect quantitative primary data at household level. The ARC commissioning of Process

Evaluations therefore plays an important role in providing information about this, as well as government monitoring systems.

6. The exploratory approach taken in this evaluation to try gain a better understanding of the impact of the drought response on beneficiary households, using modelling on limited data sets that were not designed to provide a quantitative measures of impact, provided limited and relatively weak evidence on impact. It was able to provide some information on the characteristics of beneficiaries and, for beneficiaries, on how self-reported outcomes varied in relation to the type of support received and with other household characteristics. It was not able to provide a more rigorous estimate of household level impact using a comparison of outcomes between beneficiaries and comparable non-beneficiary groups. This is because the data sets were limited (by design): they included only beneficiaries and used only self-reported post-distribution measures of welfare. It proved impossible to obtain other data that might have provided some external comparisons to understand how effective targeting had been. Given these constraints, the approach used does not, and was not intended to, provide an appropriate, general method for estimating household impact in future ARC evaluation work.

7. Consideration of the findings of the Senegal impact assessment also highlights several issues of importance that the study was not explicitly designed to address, or did not succeed in finding evidence about, that could potentially be addressed in the remainder of the ARC evaluation:

    a. the sustainability of the capacity development model including through support provided by ARC Agency;

    b. whether the resources and capacity available are sufficient to address any climate-related emergency needs (including minor or localised droughts) in years when ARC insurance payouts are not triggered;

    c. the appropriate way in which ARC-funded drought response and systems should be integrated with the wider social protection system;

    d. the appropriate national strategy in relation to the proportion of total relief costs that ARC insurance payouts should be covering in relation to the overall budget for disaster preparedness;

    e. the factors that may influence the extent to which the success of ARC Replica in Senegal can be repeated in other countries.

Implications for the remainder of the ARC evaluation

The ARC evaluation design currently envisages two more country case studies being carried out in the first round of the impact phase of the evaluation, along with three more country case studies as part of the second formative evaluation, and a further three country case studies in the second round of the impact phase. Overall, there is a trade-off for the evaluation between the depth of investigation of each country and the number of countries for which information can be collected. Understanding better the conditions under which the ToC holds, and potential risks may require consideration of a wide range of national experiences reflecting different conditions, rather than more detailed investigation of a smaller number of experiences. There may also be a case for using evaluation resources to investigate further specific issues or themes across groups of countries, rather than focusing on individual country case studies. Such issues could include, for

instance, making a full comparative assessment of ARC Replica initiatives in different countries, or reviewing approaches to DRM M&E across countries to identify good practice. It may also be appropriate to collect information from some countries that have not taken out ARC insurance policies as a basis for comparison.

Some of the issues emerging, identified above, are also not fully covered by the evaluation questions identified in the inception report. These considerations suggest a need for some revision to the EQs for the ARC Evaluation to ensure that key emerging issues are properly addressed, and potentially for a revised approach to future country case studies – including their number and scope, and whether some resources should be redirected to thematic studies across groups of countries rather than individual country case studies. Specific recommendations reflecting this are set out in section 7.3.4 below.

7.2 Lessons

The following main lessons from this study can be identified (in addition to the specific implications for the remainder of the ARC Evaluation):

1. The ARC model can succeed in building national DRM capacity and improving response, though the extent to which this capacity may be sustainable without continued support through ARC Agency remains to be established.

2. The ARC Replica model can improve the effectiveness of coordination between NGOs, and between NGOs and government, and may provide an opportunity for more innovative approaches to the provision of support to be implemented, potentially providing lessons that can also be applied by government systems.

3. Making reliable empirical estimates of the household impact of drought relief and related aid would require a well-designed and integrated strategy for data collection and analysis, planned in advance of the onset of the emergency, and even then may be challenging to undertake in practice. National governments will need to decide on the feasibility and importance of this for any particular drought response.

7.3 Recommendations

7.3.1 Summary of recommendations from the Process Evaluation

The ARC Process Evaluation produced recommendations that are set out in full in Annex E and are summarised below.

1. ARC should consider adjusting the ARV so that data can be disaggregated to lower administrative units.
2. ARC and the GoS should make efforts to align FIP preparation with the Harmonised Framework.
3. ARC and ARC-funded implementers should further detail the SOPs outlined in the FIP. The following SOPs should be added or further detailed:
   a. Bank account creation and management (open an account exclusively for ARC funds and appoint an account manager).

   b. Communication and Coordination (establish mechanisms for regular coordination of intervention activities between relevant stakeholders and for collaboration between central and local levels).
   c. Implementation (ensure intervention activities are implemented in local communities within the timeframe specified).
   d. Monitoring and Evaluation (create an M&E system for all interventions that takes specified considerations, ensure regular monitoring of intervention activities against the goals stipulated in the FIPs; implement a feedback and complaints mechanism for all interventions)
   e. Gender and Vulnerable Group Inclusiveness (to ensure that women and vulnerable groups are consulted and involved in decision-making, that their specific needs are taken into account in needs assessment and implementation, and that qualitative data is disaggregated).
4. The GoS should consider updating the RNU database of beneficiaries.
5. The GoS and ARC should explore a more robust solution for the receipt and disbursement of ARC funding.
6. The GoS should consider expanding the selection of food items in distributions to promote better dietary diversity.
7. With regards to monitoring, we highly recommend that the Start Network conduct a workshop and share their monitoring processes and experiences with the GoS and ARC.
8. ARC should begin developing guidance that address multiple cascading events.
9. For future payouts, the GoS should consider channelling more funding to a revolving fund account to be used for early action
10. ARC and its country and Replica partners should continue to explore ways to take into account various marginalised groups (such as the elderly, sick, or disabled).

This study endorses these recommendations while suggesting additional recommendations in the following sections.

7.3.2 Recommendations to ARC

The following recommendations are proposed for consideration by ARC Agency:

1. Use the lessons from the positive experience with ARC Replica in Senegal to inform and encourage the use of this model in other countries.

2. Strengthen the focus on improving government M&E within ARC Agency support. A wider range of evidence (including experience in other countries) will need to be drawn on to develop an appropriate approach but elements of this for consideration include:
   a. establishing a TWG sub-group on M&E as part of the standard ARC model;
   b. defining standards for, and providing guidance on, DRM M&E;
   c. ensuring adequate resources for M&E are budgeted as part of FIPs;
   d. providing advice, experience sharing and technical assistance to strengthen DRM M&E; and
   e. reviewing the M&E arrangements as part of ARC review of FIPs (e.g. against the standards and guidance).

3. Review the Process Audit Guidelines and general ToR for process evaluations of ARC payouts and the specific issues to be addressed in each case, focusing in particular on:
   a. the scope, priorities, and appropriate level of resourcing for process evaluations;
   b. the effectiveness of targeting;

c. obtaining information from non-beneficiaries as well as beneficiaries;
d. improving the documentation of the process evaluation approach, especially around sampling;
e. strengthening the analysis of costs and undertaking cost effectiveness analysis; and
f. ensuring effective coordination with other M&E and data collection processes.

7.3.3 Recommendations to GoS

In addition to the recommendations provided by the ARC Process Evaluation in Annex E, we also recommend that GoS:

1. Establish clear, evidence-based, guidance on the appropriate support packages required for different profiles of household (including households of different sizes), including a policy on the appropriate conditions for providing food, cash, or other forms of support.

2. Strengthen the M&E system for disaster response specifically to ensure that: (a) it can be determined whether assistance is actually reaching the intended beneficiaries; (b) reliable estimates of the results achieved can be made; (c) any differences in results and access to support relating to gender or for socially disadvantaged groups can be identified; and (c) lessons can be learned for the future.

3. Clarify the relationship, and strengthen integration and coordination, between disaster response and the developing social protection systems, including strengthening the reliability and updating processes for the RNU database, as part of a more comprehensive approach to effective targeting of support.

7.3.4 Recommendations for the remainder of the ARC Evaluation

1. OPM will review the evaluation questions for the remainder of the evaluation in consultation with FCDO, ARC Agency, and the ARC Evaluation Reference Group and where necessary revise these to ensure the evaluation produces the most relevant evidence, taking into account the issues identified in section 7.1.5 and other issues identified by stakeholders.

2. OPM will work with ARC Agency to review the ARC Theory of Change, specifically to incorporate ARC Replica, but also to ensure there is fully shared ownership and understanding of the Theory of Change.

3. OPM will review the evaluation design outlined in the inception report in response to the above. An outline of the priority evaluation questions for the second formative evaluation and the approach to addressing them will be developed first. The work undertaken during the second formative evaluation, including revisiting the TOC, will then be used to revisit the design of the remaining ARC evaluations. This will consider any suggested changes to the structure of country case studies and other evaluation research activities (for instance thematic studies on particular issues). This will be discussed and agreed with FCDO, ARC Agency and the Evaluation Steering Group as the basis for the remainder of the evaluation.

4. Appropriate national level evaluation governance arrangements should be put in place for each country case study as early as possible in order to ensure effective national government engagement.

5. Given the profile of countries in which ARC operates, OPM needs to strengthen its core evaluation team's capacity to work effectively in francophone contexts.

6. The approach and instruments used to assess DRM capacity development and ARC's contribution to it in the Senegal pilot should be used as the basis for one workstream of future country case studies, though a more formalised classification of the elements of DRM capacity should be developed in line with research evidence.

7. The approach to the assessment of ARC's contribution to finance should be revised to focus more explicitly on the assessment of financial needs and how far ARC has contributed to meeting them.

8. Where country case studies are taking place at the time of an ARC payout, there should be close coordination between the design of the Process Evaluation and the country case study to ensure complementarity and avoid duplication or overlap.

9. For each country case study, a detailed assessment should be made as part of the design process of the data and analysis that is available to assess the effects at household level, to determine as part of the design process what evidence relevant to the ARC evaluation may be available and what level of resourcing should be allocated to this workstream. Where possible the ARC Evaluation Team should seek to influence (in coordination with ARC Agency) ongoing or planned data collection processes to improve household level evidence, and to ensure that available data can be accessed for the purpose of the evaluation. This evidence will provide a useful contribution to understanding the effectiveness of government drought responses, but as noted above does not provide evidence of the impact of ARC itself.

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Annex A List of key informants

Name	Organisation	Position/Role
ALSAC, Bénédicte	Agence Française de Développement	Task Team Leader, Rural development and biodiversity sectors.
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BRANDERS, Nuria	World Bank, Senegal	Social Protection Specialist
CAMARA, Dr Maty Diagne	Direction de la Santé de la Mère et de l'Enfant /MSAS	Head of the Food and Nutrition Division, (Division de l'alimentation et de la nutrition -DAN)
CAMERON, Lloyd	FCDO	Disaster Risk Finance Adviser
CHIRUME, Malvern	ARC Ltd	Chief Underwriting Officer
DIABY, Aboubacar	ARC Agency	Senior Monitoring & Evaluation Officer
DIALLO, Amadou	Start Network	Regional Disaster Risk Financing Coordinator
DIARRA, Papa Zoumana	ARC Agency	Head of Contingency Planning Unit
DIAW, Mbaye Seye	CLM	Assistant en suivi evaluation
DIEYE, Abdou	ARC Agency	M&E Officer
DIOP, Massamba	ARC Sénégal	Coordonnateur national
EVANS, Lara	USAID	Social Protection Advisor
GALVO, John	ARC Agency	Risk Analysts
GEORGE, Christiana	ARC Agency	Gender Advisor
GUEYE, Mame Marie Ba	SECNSA/ Direction de la Concertation, des Prospectives et Gestion des crises alimentaires	Spécialiste en gestion des crises alimentaire/chef de service Gestion des crises alimentaires

Name	Organisation	Position/Role
JARIK, Khadija	Global Affairs Canada	Development Project Officer
KANE, Khady	DIREL, Ministère de l'Elevage et des Productions Animales	Point focal ARC/Chef de bureau gestion de l'information pastorale/ Division pastorale et sécurité àlimentaire du bétail
MANSIS, Nicole	SECNSA	Directrice de la concertation des prospectives et de la gestion des crises alimentaires
NOBA, Abdoulaye	Direction de la protection civile (DPC)	Directeur national
ONZIMA, Benard	ARC Agency	Head of Technical Support Division
RAYAR, Arnaut	Ministère de l'Europe et des affaires étrangères, France	Environment and Climate Department
SAKHO, Seck Fanta	Ministry of Finance and Budget / Budget Programming Directorate	Programme Officer
STAHLBERG, Kathryn	USAID	Senior Risk Advisor, Center for Resilience, Bureau for Resilience and Food Security

Annex B Evaluation Questions and ARC Evaluation Framework

Pathway 1: Supporting Timely and Effective Response [Financing Aspects]

Q2: To what extent has ARC contributed in Senegal to timely and effective responses that protect affected households' livelihoods and prevent asset loss and food insecurity?

	General Summary Question	Questions for Senegal Impact Assessment	Selected Detailed Evaluation Questions
2.1	Does the ARC model lead to enough disaster financing for different size slow and rapid onset disasters to make a crucial difference in the livelihoods of households? In what way is ARC's impact limited when other planned sources/mechanisms of financing are not available?	What has been the aggregate level of funding available to respond to the 2019 drought? How has ARC's involvement contributed to this, directly and indirectly?	To be addressed by the Financing Study: What financing has been provided by ARC? What other (planned or emergency) sources of funding have been available to support disaster response in Senegal? To what extent have other sources of funding been supplementary to ARC's funding in Senegal? To what extent has ARC risk finance been coordinated with and complemented on-going social protection and humanitarian responses? To what extent has ARC contributed to attracting additional funding in Senegal?
2.2	Where pay outs have occurred, to what extent have countries implemented contingency plans effectively? What have been the drivers of a successful CP implementation? What have been the barriers to an effective CP implementation?	To what extent have Senegal's contingency plans been implemented effectively? What factors have influenced the effectiveness of contingency plan implementation?	The ARC process evaluation seeks to answer the following questions: To what extent activities carried out by the Government and the Start Network are consistent with the ones planned in the FIP? When did FIP activities take place? To whom were the FIP activities actually directed to and how this compares to the plan? To what extent did the FIP implementation achieve its expected results, including the timely delivery of relief assistance? What are the barriers/facilitators to the implementation of the FIP activities? How cost-efficient were the activities carried out? How well coordinated were the implementation of the activities supported by the pay-out with other relief programs across the country? Were ARC Standards Operating Procedures followed by the Government of Senegal and the StartNetwork during the implementation the FIP, if not why?

	General Summary Question	Questions for Senegal Impact Assessment	Selected Detailed Evaluation Questions
			How were gender objectives and mainstreaming principles included in the interventions carried out by the Government of Senegal and the StartNetwork? Discussions will take place with ARC and the selected contractor for the Process Evaluation with a view to ensuring the Process Evaluation also addresses the following: To what extent and how did ARC review influence the CP and FIP? To what extent and how did the timing of ARC payments affect implementation of the contingency plan? Did the ARC funding go to the activities as described in the FIP? If not, how were the funds used and why? How has Senegal used the flexible CP procedures to refine plans at Final Implementation Plan (FIP) stage, and making adjustments to plans during delivery due to realities on the ground? To what extent and how did the use of this flexibility improve effectiveness of response? To what extent have political, institutional and other contextual factors (including the covid-19 pandemic) affected implementation?
2.3	Is the ARC iterative learning model capturing lessons-learned from various country implementations, leading to future improvements in country response delivery?	What lessons emerge from Senegal's experience in both 2014 and 2019 for ARC and for the Government of Senegal?	What lessons were learned from the 2014 drought response and how did they affect subsequent contingency plans and the FIP?
2.4	What evidence is there that pay-outs to governments and the implementation of ARC Contingency Plans have contributed to the protection of livelihoods and food security, and prevented asset loss?	To what extent and how have payouts to government and the implementation of ARC Contingency Plans contributed to the protection of livelihoods and food security and prevented asset loss in Senegal?	The econometric modelling exercise will address the following questions: To what extent has the pay-out received through the ARC programme increased asset retention and/or improve livelihoods of beneficiary households (e.g. increased food security and nutrition) as compared to non-beneficiary households? To what extent have household characteristics played a role in determining the effects of the pay-out? (household size and combination, and existing level of income and wealth (asset)) To what extent have the effects of the pay-out varied according to geographical location (livelihood zones)?

	General Summary Question	Questions for Senegal Impact Assessment	Selected Detailed Evaluation Questions
			Have the timing, frequency, and duration of disbursement affected the probability of asset retention/improved livelihood? What was the effect of shocks on non-beneficiary households?[68]
2.6	Is there evidence that links a country's improved DRMF planning to continuous growth?	To what extent and how has ARC support contributed to protecting Senegal's macroeconomic performance?	To be addressed by the Financing Study: To what extent has the 2019 drought, and then the covid-19 pandemic, had macroeconomic consequences (growth, inflation, investment, trade balance) for Senegal? To what extent has improved planning and financial support contributed to offsetting adverse macroeconomic shocks?

[68] Being able to answer this question will require obtaining data on households in the same geographical locations that share similar characteristics as beneficiary households but do not receive the pay-out.

Pathway two: influencing Disaster Risk Management policy and practice of ARC member states through on-going engagement and capacity building

Q3: To what extent has ARC influenced Senegal's capacity to anticipate, plan, finance and respond to climate related disasters, and in making best use of ARC?

	Summary Questions (ARC Evaluation Framework)	Questions for Senegal Impact Assessment	Detailed Evaluation Questions
3.1	Is there evidence of countries taking action **[to build and strengthen institutional capacity in analytical and logistical skills]** (e.g. creation of broader risk-management platforms, planned budgetary expenditures related to DRM, uptake of insurance or other risk-financing products, etc.) as a result of increased knowledge of DRM and quantified risk **[acquired via ARC?]** What evidence is there that the change is sustainable?	To what extent and how has Senegal's capacity (institutional, organisational, and individual) to anticipate, plan, finance and respond to climate related disasters changed since the 2014 drought? What factors have influenced these changes in capacity? How has ARC contributed to changes in capacity? To what extent and how did improvements in capacity contribute to a more effective response to the 2019 drought?	These questions relate in principle both to government and non-government capacity and will be addressed by the capacity study: What are the main elements of the regulatory and legal framework for disaster response in Senegal? How have these changed since 2014? What factors have influenced these changes? What are the organisational arrangements for disaster response in Senegal? How have these changed since 2014? What factors have influenced these changes? What strategies, policies and plans to deal with disaster response have been in place in Senegal? How have these changed since 2014? What factors have influenced these changes? What information, research and analytic approaches are available in Senegal and how have these been developed and used since 2014? What factors have influenced their development and use? What technical assistance and training has been provided in Senegal related to disaster response (since 2014)? How effectively has this contributed to developing institutional, organisational and individual capacity? What capacity building support has been provided through ARC? How effective has this support been? To what extent and how did improvements in capacity contribute to a more effective response to the 2019 drought and to the Covid-19 pandemic? How sustainable are any improvements? What lessons and recommendations for improvement can be derived from the experience?
3.2	What combination/network of stakeholders has ARC	How effectively have stakeholders in Senegal	To be addressed by the stakeholder analysis component of the capacity study:

	engaged in the country to support policy and practice change and is this the relevant network for changes to occur?	worked together for disaster risk management, and how has this changed since 2014? To what extent and how has ARC contributed to building stakeholder commitment and effective cooperation in disaster response management?	Who are the key stakeholders in disaster risk management in Senegal? What are their interests and how do they exert influence over disaster risk management policy and response? What was the role of different stakeholders in renewing the ARC policy and the development of the contingency plan and its implementation? How has ARC engaged with stakeholders in Senegal? How effective has this engagement been in building commitment and cooperation? What lessons and recommendations for improvement can be derived from the experience?
3.3	Does ARC engagement within member states lead to tangible commitments from governments in terms of dedicated resources and time?	To what extent and how has ARC engagement with Senegal contributed to commitments of staff and other resources and time to disaster risk management?	To be addressed by the financing study: What resources have been budgeted for DRM, and how has this changed over time? What are the arrangements for budgeting and paying the ARC insurance premium? Who makes decisions about DRM resources and finance, and how are these decisions made? Has GoS included annual ARC premiums and/or funds for other DRM planning in its national budget? Has it institutionalised disaster resource within its ministries and agencies and its policy development? What is the trend over time in the number and calibre of staff working on DRM in government agencies? How much of any increase in numbers/calibre can be attributed to government's own actions or to actions of other development partners?

Annex C Poverty measures in Senegal

The official poverty measurement methodology in Senegal follows the Cost of Basic Needs approach.[69] The welfare measure is consumption per adult equivalent. Individual welfare is measured by estimating total household consumption and dividing this by its composition-adjusted household size (the number of "adult equivalents"), which aims to account for children's lower caloric consumption requirements relative to adults. A simple equivalence scale is used whereby children aged 15 or younger are counted as 0.5 adult equivalents. A poverty line is subsequently calculated that represents a minimum acceptable living standard and includes both food and non-food components. A person is considered poor if his or her consumption level (i.e. consumption per adult equivalent) is less than the total poverty line. The food poverty line represents the cost for a person to meet minimum caloric requirements.[70]

It is estimated that an adult requires 2,400 calories per day. People who cannot secure this level of food consumption even if their total consumption were devoted to food are considered "extreme poor". In Senegal, separate poverty lines are used for the three zones: Dakar, "other urban", and rural areas. The total poverty lines for "other urban" and rural areas were about 80% and 60% respectively, of the Dakar poverty line, reflecting higher costs of living in the capital. However, due to the fact that a different non-food share was used for each of the poverty lines, these lines may reflect differences other than just price differences. For a single adult in Dakar, the poverty line is CFA 1,014 per day ($2.87 per day in 2005 PPP). In other urban areas, it is CFA 809 per day ($2.29 per day in 2005 PPP). In rural areas, it is CFA 606 per day ($1.72 per day in 2005 PPP).[71]

To arrive at the total poverty line, the non-food component of the poverty line was defined by estimating non-food consumption among households whose food consumption is within 5% of the value of the food basket. The average value of these households' non-food consumption is taken to be the non-food part of the poverty line. This is done separately for each of the three areas, resulting in a different total poverty line for each area in 2011 (using data from ESPS-II).[72]

In addition, to obtain, for example, the total poverty lines for 2001 and 2005, one must make adjustments to reflect price changes between those years. The values of the food basket (the food poverty line) for each of the three areas in each survey year were used as "deflator" – that is, to correct for price differences between those years for each of those areas. This assumes that the price changes of food items are a good approximation of the price changes of non-food items consumed by the poor in each of these areas, an assumption that might be too strong if non-food

[69] World Bank (2015). Poverty Assessment for Senegal. World Bank, Washington, D.C.
[70] World Bank (2016). Mapping the poor in Senegal: Technical Report. World Bank and Agence Nationale de la Statistique et de la Démographie (ANSD).
[71] Ibid.
[72] Poverty monitoring survey conducted by the National Agency of Statistics and Demography in partnership with the World Bank. The ESPS-II is the second of its kind, after that of 2005-06.Information is collected on education, health, employment, household wealth and comfort, access to basic community services and household spending, population's point of view on their living conditions and their expectations from the state, religious practice, shocks and climate change. They also address priorities and solutions for poverty reduction as well as the people's perception of institutions. Units of analysis are household and individual. Individual questionnaire includes individual characteristics, education, health, employment, unemployment and domestic activities, income, internal migration. Household questionnaire includes household composition, internal migration, housing characteristics, expenditure, food consumption, community activities, and social assistance (see https://catalog.ihsn.org/catalog/4311#metadata-questionnaires).

price changes move differently from the food price changes.[73] Official poverty rates are usually produced at a national and regional level.

[73] World Bank (2016).

Annex D Senegalese participation in ARC capacity-building events[74]

Events	Dates	Participants from Senegal	Objective/Outputs
ARC Secretariat hosted a risk transfer seminar	April 2013.	For government experts and other partners who are vital to the risk transfer process	Basic insurance concepts that define an insurance contract, such as the attachment level, exhaustion point, ceding percentage, contract limits, how premium is calculated and how ARC Ltd financial analysis and risk management coverage options available for Senegal
Risk transfer training in Senegal, (Since then, the Government of Senegal has participated to ARC Risk Transfer training session every year, through regional and national workshops.)	2013	For government experts and other partners who are vital to the risk transfer process	
Regional workshop-Ouagadougou	20 July 2017	GoS experts	Learn from past experiences of ARC risk pool countries as potential entrants into ARC's pool. To facilitate a cross-regional exchange of experiences
Regional workshop-Johannesburg	11-13 July 2018	GoS experts	Enhanced awareness and understanding of the ARC programme structure and its relation to DRFI systems in the ESA region. Lessons that would feedback into improving programme implementation within the region. Enhanced implementation and adoption of the ARC mechanism in the ESA region.
Atelier technique ARV	27 - 29 November 2018	GoS experts, TWG members	Capacity built on Customisation(refresh session)
RTP Workshop-Nairobi	10th – 11th September 2018	For government experts	Strengthen the understanding of participants on the ARC RTP selection and associated processes. Peer-review country level RTP's selection modalities and considerations in preparation for participation in the 5th ARC

[74] Data provided by ARC Agency.

			drought risk pool commencing in October 2018. Identify approaches to strengthen long-term and sustainable participation in ARC drought insurance risk pools.
M&E Capacity training-Dakar	1st October 2018	10 participants from Direction Agriculture, DPC, DIREL, CSE, CSA, START network	To assess Senegal drought specific-M&E capacity: To introduce monitoring and evaluation concepts and ARC requirements in monitoring and evaluation related to the Operations Plan
Formation sur les aspects fondamentaux du développement de produits d'assurance indicielle climatique et de leur application à la gestion du risque climatique.	1 au 4 juillet 2019	GoS experts, TWG members	build the knowledge of African governments, the private sector, and the international community to better carry out financial planning necessary to protect vulnerable populations against climate shocks, disasters, and other crises.
Regional workshop-Abidjan	17-18 September 2019	GoS experts, Startnetwork	Lessons learnt and best practices stock taking
Table ronde avec les compagnies d'assurance locales (CNASS)	June 2019	For government experts and insurance key actors	Exchange experience
Atelier CP	5 - 6 September 2019	GoS experts, TWG members	Capacity built on CP développement (refresh session)
Atelier technique ARV	2 - 6 November 2020	GoS experts, TWG members	Capacity built on Customisation
Gender training	8 October 2019	GoS experts, TWG members	Gender mainstreaming capacity of the ARC Government Coordinators is built to enable them effectively guide the Member States on integrating gender in their DRM processes.

Annex E Recommendations from the Kimetrica Process Evaluation[75]

ARC should consider adjusting the ARV so that data can be disaggregated to lower administrative units, such as departments, to allow for better comparisons between monitoring systems, thus providing more accurate information for decision-makers.

ARC and the GoS should make efforts to align FIP preparation with the Harmonised Framework to improve efficiency.

ARC and ARC-funded implementers should further detail the SOPs outlined in the FIP. The purpose of the SOPs is to ensure that implementation is done both effectively and efficiently, as well as to help provide a basis of measurement of levels of compliance. However, there were implementation steps not accounted for in the current SOP matrix that have large implications for implementation more broadly. Therefore, there are several steps in implementation that were reviewed and analysed through the course of the process audit but could not be included in the SOP Matrix which assesses compliance. We recommend the following SOPs be added or further detailed in order to better assess levels of compliance for future payouts:

- **Bank account creation and management:**
  - Open an account exclusively for the management of ARC funds, to be positioned under the auspices of the Ministry of Finance and Budgeting.
  - Appoint an account manager to administer finances in the ARC-specific bank account per regulations on public accounting and project management.
- **Communication and Coordination:**
  - Establish mechanisms for regular coordination of intervention activities between relevant stakeholders (coordination plans, committees, commissions, etc)
  - Establish mechanisms for collaboration between central and local levels.
- **Implementation:**
  - Intervention activities are implemented in local communities within the timeframe specified.
- **Monitoring and Evaluation:**
  - Create an M&E system for all interventions that takes specified considerations into account (geographic targeting, etc)
  - Regular monitoring of intervention activities against the goals stipulated in the FIPs, ensuring households receive appropriate supplies and quantities, unit costs are as stipulated in the FIP, and timing of activities are as planned.
  - Implement a feedback mechanism for all interventions where beneficiaries, suppliers, and service providers can provide implementers feedback and lodge potential complaints.
- **Gender and Vulnerable Group Inclusiveness:**
  - Women's needs are taken into account in needs assessments and implementation.
  - The needs of all relevant vulnerable groups (elderly, disabled, ethnic minorities, etc.) are taken into account in needs assessments and implementation.

[75] This annex reproduces for reference the recommendations presented in Chapter 12 of the Kimetrica Process Evaluation.

- Women are included in the management of interventions and in all decision-making levels.
- All contextually relevant vulnerable groups (elderly, disabled, ethnic minorities, etc.) are consulted in the management of interventions and included in all decision-making levels.
- All qualitative data should be disaggregated by gender (and other potentially vulnerable groups), where applicable and relevant.

The GoS should consider updating the RNU database of beneficiaries considering the many discrepancies identified by the Start Network during the targeting process and by Kimetrica during the sampling/listing exercise for the process audit household survey. Alternatively, in the future, the GoS should make every effort to ensure community-based targeting activities occur to ensure that ARC response funds reach those most in need. It would be valuable if the Start Network could share with the GoS and ARC lessons learned from conducting their participatory approach so that it can be duplicated in the future by GoS and in other countries.

The GoS and ARC should explore a more robust solution for the receipt and disbursement of ARC funding. Either the process for establishing a special account must begin much earlier so that all the approvals can be executed prior to the disbursement of fund, or the GoS should consider setting up a permanent account. The delays in disbursement of funds were costly, contributing to the cancellation of targeting activities and, in part, the cancellation of the screening of malnourished children

The GoS should consider expanding the selection of food items in distributions to promote better dietary diversity. Food items such as oil and sugar could be added to the current food basket to improve nutritional security at household levels.

With regards to monitoring, we highly recommend that the Start Network conduct a workshop and share their monitoring processes and experiences with the GoS and ARC so that future governments and organisations receiving payouts can benefit from their success. We also recommend that, in the future, ARC makes an effort to link the monitoring processes of the Replica Partners with those of government so that capacity can be shared and built. Finally, we recommend that ARC require market surveys. Findings from this review indicate these surveys were very useful to ensure that local markets and households' medium-term access to food and income were not put in jeopardy.

ARC should begin developing guidance that address multiple cascading events. COVID-19 emerged while national stakeholders were implementing the ARC payout activities aimed at mitigating the impact of the 2019 drought. Without any guidance on how to handle two major emergencies, Start Network and GoS institutions had to innovate to find the best procedures to cope with the shocks, protect their staff and beneficiaries, and still meet the intervention objectives.

For future payouts, the GoS should consider channelling more funding to a revolving fund account to be used for early action. The revolving fund system is an innovative national initiative which could strengthen local ownership of resources, mitigate the impact of food insecurity in pastoral and agro-pastoral areas, and strengthen the livelihoods of pastoral households. To achieve these objectives, the funds should:

- Be managed locally with a minimum oversight from MEPA. When needs are assessed at local level, the funds should be released based on a specific, local needs assessment.

- The funds should be used to attract bank loans. Bank loans could be used to finance pastoral sustainable programs aimed at strengthening the livelihoods of pastoral households, such as drilling wells or holding vaccination campaigns.

The ARC payout could be directed to the revolving fund account, which could be used for early action, easing the impact of the drought before implementation. ARC rules and regulations should apply.

ARC and its country and Replica partners should continue to explore ways to take into account various marginalised groups (such as the elderly, sick, or disabled) in order to address the specific needs of these groups in targeting, representation in local decision centres, and distribution.

Annex F Needs assessment (from FIP)[76]

1.3. Regions and departments affected by drought

The current 2019/2020 crop year has given rise to serious concerns due to the very late rainfall in the agricultural and livestock production areas in the north and center of the country. This situation is coupled with a rainfall deficit over a large part of the country's territory.

The agricultural season started in the eastern part of the country with quite early rains (June 11 in Kedougou). For the agricultural zones in the center of the country (Koungueul, Nioro) and in the departments of Tambacounda, Kolda and Vélingara, the rainy season started during the last ten days of June. The departments of Bakel, Goudiry and Ziguinchor received their first rains between 01 and 05 July 2019. Compared to normal, the start of the season is delayed by one (1) to three (3) weeks depending on the localities.

Despite a dry spell of more than 10 days in some areas of the central and northern zones (Louga, Thiès, Diourbel, Matam), regular wet spells were registered from the end of July to the end of August 2019.

However, these concerns are still valid in the region of Matam where the rains are very insufficient. Compared with the 1981-2010 average rainfall, the situation remains deficient in the Matam-Ranérou-Linguère axis and normal in the rest of the country.

This could have an adverse effect on crop yields and consequently on agricultural production.

However, these drought-affected areas identified by the technical services match with the ones identified by the ARV software. The following regions are concerned: **Diourbel, Kaffrine, Kaolack, Dakar, Thies, Fatick, St. Louis, Louga, Matam, Tambacounda**, in addition to the departments of **Sédhiou, Ziguinchor** and **Bignona**.

This gloomy situation will obviously have an impact on yields and, in turn, on agricultural production, especially that of cereals, which could have an impact on the food security of agricultural households.

Table 12: Estimated populations currently affected by drought and food insecurity

1st administrative level: *Region/Province*	2nd administrative level: *District*	Total population in 2019	Affected Populations, 2019 (ARV)	Populations affected in November 2019
Dakar	Rufisque	583,774	5,998	11,997
Sédhiou	Sédhiou	184,742	7,645	15,290
	Bounkiling	177,706	5,515	12,869
	Goudomp	190,557	7,622	13,339
Kolda	Kolda	295,795	11,832	17,748
	Vélingara	334,746	17,271	27,634
	MYF	166,042	6,854	11,994

[76] This annex is an excerpt from the GoS FIP.

Tambacounda	Tambacounda	369,510	3,830	7,659
	Goudiry	141,853	2,940	4,411
	Koumpentoum	158,634	1,644	6,576
	Bakel	171,521	5,333	7,111
Saint Louis	Podor	433,811	26,029	99,777
	Dagana	282,804	5,656	11,312
	Saint Louis	346,926	6,939	10,408
Matam	Matam	342,164	10,265	17,108
	Kanel	299,471	11,979	20,963
	Ranérou	64,402	4,508	6,762
Kaolack	Kaolack	587,730	2,995	17,632
	Guinguinéo	138,506	2,770	20,776
	Nioro	429,198	4,192	8,384
Diourbel	Diourbel	322 762	6,455	12,910
	Bambey	360,380	10,811	18,019
	Mbacké	1,118,849	33,565	44,754
Louga	Linguère	285,743	11,430	17,145
	Louga	440,859	4,409	8,817
	Kébémer	306,043	15,302	24,483
Ziguinchor	Ziguinchor	299,364	9,276	15,460
	Bignona	304,535	9,436	15,727
	Oussouye	58,280	2,408	3,612
Kédougou	Kédougou	95,599	4,942	9,884
	Salémata	26,920	2,226	6,958
	Saraya	61,756	1,915	3,192
Thiès	Mbour	787,349	23,620	39,367
	Tivaouane	532,261	11,832	26,613
	Thiès	786,097	15,722	31,444
Fatick	Fatick	413,302	4,133	41,330
	Gossas	116,612	3,498	5,831
	Foundiougne	340,444	3,404	6,809
Kaffrine	Kaffrine	257,696	18,039	20,616
	Koungheul	202,803	8,112	10,140
	Birkilane	125,596	3,768	6,280
	Malem Hoddar	117,462	3,524	4,698
TOTAL		**12,962,929**	**359,646**	**723,839**

Source: *SECNSA, completed with the Harmonized Framework results of November 2019*

Nutritional assistance:

The various surveys and evaluations carried out in recent years reveal a precarious food situation and a deterioration in the nutritional status of children (EDS 2016 and 2017; SMART 2015; ENSANR 2019). Thus, Nutrition Programs focused on:

- Screening and management of moderate acute malnutrition at community level and in health facilities;
- The referral of SAM cases to health facilities;
- The treatment of severe acute malnutrition with and/ or without medical complications in health facilities.
- Nutritional surveillance and prevention of malnutrition in children, pregnant and lactating women. This package includes communication towards a behavioural change, WASH program, coordination and capacity building through formative supervision of operational level actors.
- At the level of the Ministry of Health, case management is based on the National Malnutrition Management Protocol and the Standards and Protocols Policies that have been reviewed and validated.

The identified interventions focus mainly on:

- Passive MAM screening and case management;
- Screening of complicated or uncomplicated SAM cases and case management;
- Supervision activities as part of capacity building;
- Communication for a change of behavior.

With respect to nutritional assistance, it will be implemented by two (2) institutions, namely the Unit to Combat Malnutrition (CLM, Cellule de lutte contre la malnutrition) and the Food and Nutrition Division (DAN) of the Ministry of Health and Social Action (MSAS). These two structures will play a role of complementarity in relation to the intervention zones and the management of cases of malnutrition (MAM and SAM).

Table 13: Estimation of children aged 0-59 months affected by acute malnutrition

Region	***Department***	***Overall Population***	***Affected Population, 2019 (estimates based on previous screenings)***
Dakar	Dakar	1,326,194	
Dakar	Guédiawaye	381,475	
Dakar	Pikine	1,354,183	
Dakar	Rufisque	567,825	
Diourbel	Bambey	349,284	1,205
Diourbel	Diourbel	312,822	1,220
Diourbel	Mbacké	1,084,391	3,701
Fatick	Fatick	399,500	506
Fatick	Foundioungne	329,074	540

Fatick	Gossas	112,718	263
Kaffrine	Birkelane	121,204	499
Kaffrine	Kaffrine	248,686	717
Kaffrine	Koungheul	194,876	906
Kaffrine	MalemHoddar	113,356	311
Kaolack	Guinguinéo	134,307	187
Kaolack	Kaolack	569,909	1,239
Kaolack	Nioro	416,187	1,138
Louga	Kébémer	297,672	517
Louga	Linguère	277,930	900
Louga	Louga	428,798	760
Matam	Kanel	288,464	345
Matam	Matam	329,588	808
Matam	Ranérou-Ferlo	62,034	164
Saint-Louis	Dagana	275,483	627
Saint-Louis	Podor	422,579	1,144
Saint-Louis	Saint-Louis	337,944	660
Sédhiou	Bounkiling	171,814	352
Sédhiou	Goudomp	184,235	364
Sédhiou	Sédhiou	178,615	589
Tambacounda	Bakel	165,521	605
Tambacounda	Goudiry	136,887	557
Tambacounda	Koumpentoum	153,084	895
Tambacounda	Tambacounda	356,582	1,398
Thiès	Mbour	766,434	865
Thiès	Thiès	765,210	848
Thiès	Tivaouane	518,122	1,027
Ziguinchor	Ziguinchor	289,902	506
TOTAL		**14,422,889**	**26,363**

Source: *Unit to Combat Malnutrition (CLM – Cellule de Lutte contre la Malnutrition)*

Livestock Assistance:

Rainfall deficit will have an impact on the grass cover with a scarcity of fodder and even the early drying up of superficial water points such as waterholes and ponds. This situation will translate into a state of food insecurity for livestock. The table below provides information on the regions and departments concerned and the number of animals affected by TLU.

Table 14: Estimation of animals currently affected by food insecurity

Region	Department	Overall population (TLU)	Estimated number of animals affected (TLU)
Saint Louis	Podor	279,911	69,978
	Dagana	88,541	22,135
Matam	Matam	136,127	34,032
Louga	Linguère	338,539	84,635
Kaffrine	Koungueul	79,262	19,815
Tambacounda	Koumpentoum	140,048	35,012
	Tambacounda	419,839	104,960
TOTAL		**1,482,266**	**370,567**

Source: *DIREL/MEPA*

Annex G Registre National Unique (RNU)

G.1 Overview of the RNU

In an attempt to gain a better understanding of the characteristics of the poor as well as the changes in the forms of poverty, and the inflows and outflows that appear for a particular form of poverty, the GoS has set up the National Unique Register or Registre National Unique (RNU). The aim is to collect data on certain social groups that are more vulnerable than others, to understand the characteristics of their situation, to highlight explanatory factors of such situation, and to suggest possible development. In addition, before the RNU was established social protection programmes had used different systems of targeting and relied on different databases of varying data quality. This had an impact of the effectiveness of the implementation of these programmes. The RNU was an effort to standardise the targeting process of recipient households.

The RNU contains data from specialised quantitative and qualitative surveys carried out in 2013, 2014, and 2015 on poor households. The ultimate goal is to make the RNU the basis for targeting a range of social protection, health, nutrition, and education as well as other development programmes.[77] The RNU database contains socio-economic and demographic information for 461,769 households in 2017 who live below the poverty line – around 28% of all households across the 14 regions, 45 departments and 552 municipalities of Senegal.[78] It is worth noting that this proportion (28%) is lower than that reported in the World Bank data (32.9% in 2019). It is unclear which poverty line was used in the RNU and how the RNU database gets updated, which could explain the discrepancies.

In each region, the number of people included in the database varies according to the levels of poverty in the departments and municipalities. Areas with low levels of poverty have fewer households in the RNU. The RNU's household selection and registration processes combine several approaches: geographical targeting, community-based targeting and through an ANSD-led survey and scorecard carried out on the basis of households' vulnerabilities reported by communities.[79] Household lists, compiled by poverty mapping, are complemented by the results of consultations with low-income group and through general discussions and observations. Below, we summarise the RNU registration and targeting process.[80]

[77] General Delegation for Social Protection and National Solidarity (GPSN). A Comparative Analysis Report on the socio-economic and demographic characteristics of beneficiaries of the SE/CNSA Food Insecurity Response Programme and the UNR (RNU) households.
[78] Ndiaye, F., Diop, O., and Sy Sarr, M. (2019). Senegal's National Single Registry (Registre National Unique): towards national coverage, International Policy Centre for Inclusive Growth Research Brief, ISSN 2358-1379 (May).
[79] *Ibid.*
[80] General Delegation for Social Protection and National Solidarity (GPSN). A Comparative Analysis Report on the socio-economic and demographic characteristics of beneficiaries of the SE/CNSA Food Insecurity Response Programme and the UNR (RNU) households.

G.2 Household registration and targeting in the RNU

The identification of households identified in the RNU was done through an approach that combined the methodology of the poverty mapping of Elbers et al., (2003)[81] with community suggestions. An estimate of the counting quotas (which corresponds to the number of households to be identified in each area) was first made based on the distribution of the poorest households of the population from the ESPS2 survey (2011), for all administrative levels, from the department to the village. The RNU questionnaire includes three sections: (i) household identification; (ii) housing characteristics, possession of goods, food consumption, shocks and strategies, social protection and access to infrastructure; (iii) information about individuals.

Table 15: Variables selected for targeting recipients on the RNU database

Number	Variables
1	Household Size
2	Level of education
3	Access to safe drinking water
4	Access to sanitation
5	Attendance sanitary structure
6	Number of meals per day
7	Schooling for children
8	Child labour
9	Disability
10	Age of the person
11	Number of possession of essential goods
12	Accommodation type
13	Covering the roof
14	Flooring
15	Covering the wall

Source: DGNPS

Targeting recipient households is done in three stages: Targeting committees made up of administrative authorities and social operators are responsible for assessing households in extreme poverty and giving them priority in access to aid. The level of household wealth was assessed using indicative resource-checking formulas, the Proxy Mean Testing (PMT) model, which is estimated separately for urban and rural areas, allowing for the selection of variables to be included in each model and having different coefficients (weight) depending on the environment. The reason is that the sub-groups of the population differ greatly and thus, specific models are

[81] Elbers, C., Lanjouw, J.O., and Lanjouw, P. (2003). Micro-level estimation of poverty and inequality, *Econometrica*, 71(1), January, 355-364.

estimated to capture such heterogeneity. Fifteen variables were selected to build the PMT model as shown in Table 15.

G.3 Limitations of the RNU database

A quota method is used to distribute the households surveyed according to different geographical areas. The effectiveness of geographical targeting depends heavily on the concentration of the poor living in a specific geographical areas. The allocation of quotas based on population size, while the incidence of poverty is not based on population size, but on a battery of indicators derived from poverty mapping exercise in the ESPS2 survey. With heterogeneity within communes and villages in terms of poverty level, the targeting process is likely to generate both error of inclusion (areas identified as poor but actually contain a significant proportion of non-poor) and exclusion errors (poor residents in areas identified as non-poor). The questionnaire could benefit from including more variables to help grasp the socioeconomic status of residents as well as other variables such as livestock and farmland ownership, victims of recurrent natural disasters, number of humanitarian and social assistance received by each households; food insecurity; and anthropometric data, especially for children and BMI data for adults (DGPSN 2017).

The questionnaire used in the RNU does not currently include household spending to assess food insecurity, household's food shortages, variety of diet and a measure of vulnerability to food shortages; and the share of food expenditure. It may be worth considering building a longitudinal dataset with periodic questionnaire administered on a yearly basis to track the changes in poverty and all other aspects of the livelihood of these households.

It would be helpful to have an accessible and publicly available documentation on methodologies for collecting, gathering and interpreting data; methodologies that could identify measurement errors, sampling bias, and what to do to solve these problems; and a common data coding system and definition of all the concepts used and all the variables. It is also important to take into account the variability of commodity prices as the average expenditures may not be sufficient to acquire sufficient food. Furthermore, currently it does not seem that vulnerability measures are included in the RNU. Vulnerability is an inclusive concept that highlights the dynamics of food insecurity, but food insecurity is not included in the RNU at the moment.

Finally, the data is shared manually on an ad-hoc basis and as revealed in the process evaluation by Kimetrica, the RNU data suffers from several errors and inaccuracy. A significant number of households' contacts are incorrect or the households have moved to different areas which are not recorded. The Start Network agencies highlighted that some households classified as poor were found to own substantial resources and land; several households who had declared that they lived in one location, had moved; there was inaccurate data on the number of young children or pregnant or breastfeeding women in the households; and inaccurate phone numbers (24%). For ARC Replica, these issues were addressed during the targeting process to yield more robust beneficiary list that was used for implementation (corrected during the coverage survey) (Kimetrica 2020). The updates were provided to the GoS for future use and were likely included in the targeting for the COVID-19 National Response – which meant that the same households were likely to receive both ARC and COVID-19 supports.

While the RNU is designed to be used as the main source to select programme beneficiaries, data inaccuracies mean that some households which are in need, are excluded from the programmes such as ARC and ARC Replica interventions, while other households that are less in need may be included in the database To limit this risk, it is necessary to put in place a proposed mechanism to regularly update the database and correct the errors, able to both 'graduate' households out of the

database if their situation improves sufficiently and add new households which meet the inclusion criteria. This should be done through a standardised process rather than by each implementing organisations as and when they use the RNU data. The step-by-step guide in updating and quality assuring the database is suggested in the study by the DGPSN (2017).

Annex H Data sources for analysis of household effects

The analysis carried out in this report is based on the household data collected for the process audit report by Kimetrica and the pay-out internal evaluation by the Start Network.

It is important to note that for neither datasets was any data collected on a comparison or control group who shared similar sociodemographic and socioeconomic characteristics to the ARC beneficiaries but who did not receive any support. The fact that both ARC and ARC Replica as well as the GoS's Covid-19 response packages covered all regions and almost all departments (if not all) makes it difficult/impossible to establish a valid comparison group. This problem was also compounded by the lack of clarity around poverty and vulnerability criteria that were used for targeting and determining the beneficiaries for the ARC, ARC Replica, and the COVID-19 response interventions.

H.1 Kimetrica Data

Kimetrica's sample covered four regions where ARC and ARC Replica interventions took place. The sampling was based on the ARC Programme Audit Guidelines which recommended household survey sample size for payouts over $10 million to be approximately 400. Some 150 households were randomly selected from the Start Network beneficiaries, and 250 randomly selected from the GoS beneficiaries, taking int account the urban-rural spread. The guidelines note that this sample size can provide national statistically representative figures based on a simple random sample. Kimetrica also over-sampled by 10 percent (for a total of 440 households) to account for uncertain conditions in the field, including migration or households being unavailable at the time of the survey. The beneficiary list was obtained from the Senegal's National Single Registry (Registre National Unique – RNU) consisting of 19,977 households which were drawn from the RNU database covering the relevant locations for the sampling. However, 910 households did not have phone numbers. A sample was, thus, randomly drawn from the remaining households with phone numbers. It is important to note that no baseline survey was carried out and thus, we have no information on these households prior to the drought and COVID-19 impact. Moreover, as mentioned in the introduction, there is no data collected on a comparison group either.

Kimetrica survey explored how beneficiaries perceived the implementation process[82]. The survey was based on ARC's Programme Audit Guidelines and was modified to be context-specific to the 2019 Senegal audit. The format used mostly dichotomous (yes/no) questions, simple rating, and straightforward numerical values (e.g. the quantity of relief items or cash received) to assess programme efficiency of operations and beneficiary satisfaction. The key sections included are:

Interview Details (interviewer's and respondent's names, phone numbers, geographical locations (region/department), whether the respondent is the head of household, gender of the respondent)

[82] The survey was carried out between **June and September**. The distributions of GoS were done between **April and July** and the Start Network did two rounds of distributions in **June and July**. So the survey started while the distribution still took place, but finished two months after the distributions were completed.

Descriptive Statistics (household size, no. of pregnant women, no. of breastfeeding women, and no. of children aged 6-59 months)

Assistance Received (received assistance (e.g. food, cash, seeds, etc.(in the last 6 months, type of assistance received, who provided the assistance, time month/year that respondent received the first/last distributions, frequency of the distribution, and most preferred type of assistance)

Targeting (understanding of how households were selected, whether the selection was perceived as fair (why/why not))

Enrolment (how did households find out they were selected as beneficiary, documentations needed to register for the programme, knowledge about (i) objectives of the programme; (ii) which organisation was providing the assistance; (iii) what the households were entitled to; (iv) beneficiary selection criteria; (v) how to provide feedback/lodge a complaint)

Implementation and Perceptions (this was asked for each type of support i.e. food distribution, cash distribution, livestock feed subsidy, and awareness raising and education campaign on nutrition and hygiene. The questions include the time it took to travel to the delivery site, the wait to collect the food, the amount received, the amount expected, did the support arrive on time and in good condition, what they did with the support, and whether the support has helped with the seven main outcome variables: avert suffering, meet monthly food requirements, improve daily household food consumption, prevent the distress sale of livestock and other assets, prevent migration of family members to cities in search for work, prevent the household from taking kids out of school, and help reduce debt).

Drought/COVID-19 Impacts (whether household has been negatively affected by drought in the last 12 months, the degree of severity of the impact, the month and year did the household start to be affected by the drought (only the month for COVID-19), and the way in which household has been affected by the drought/COVID-19).

The survey was conducted by phone between June and September 2020 with a final sample of 401 households in Diourbel, Kaffrine, Kolda, and Louga. A breakdown of household sample by Region/Department and Gender of household head was included in the report. The report also provided the same breakdown for RNU listing for the same Departments and regions – both in raw numbers rather than in percentages. We have calculated the percentage breakdowns in Table 16 below. There seems to be some variation in terms of the gender distribution across the regions. For example, in Louga the proportion of female respondents was much larger than the males, whilst in Kolda the contrary was observed.

Table 16: Kimetrica Household Survey Sample, by Department and Gender of Household Head

Region/Department	Female	Male	Grand Total
DIOURBEL	**50 (42%)**	**68 (58%)**	**118**
Bambey	9 (41%)	13 (59%)	22
Diourbel	18 (44%)	23 (56%)	41
Mbacké	23 (42%)	32 (58%)	55
KAFFRINE	**63 (54%)**	**53 (46%)**	**116**
Birkelane	19 39%)	30 (61%)	49

Kaffrine	14 (70%)	6 (30%)	20
Koungheul	30 (64%)	17 (36%)	47
KOLDA	**22 (35%)**	**41 (65%)**	**63**
Kolda	3 (38%)	5 (63%)	8
Médina Yoro Foulah	16 (33%)	33 (67%)	49
Vélingara	3 (50%)	3 (50%)	6
LOUGA	**75 (72%)**	**29 (28%)**	**104**
Kébémer	24 (56%)	19 (44%)	43
Linguère	12 (67%)	6 (33%)	18
Louga	39 (91%)	4 (9%)	43
Grand Total	**210 (52%)**	**191 (48%)**	**401**

Source: Kimetrica (2020). Draft Final Report: ARC Senegal Payout Process Audit, October.
Percentages are calculated by OPM.

The total sample consisted of 52% of female respondents on average. The average household size was 12 and 87% of the households had at least one child aged between 0 and 5 years (48% of which were female-headed households). Twenty-nine percent of households had at least one pregnant woman (46% of which were female-headed households) and 56% of households had at least one lactating women (48% of which were female-headed households). **The main limitations** of Kimetrica dataset are as follows:

- Even though Kimetrica oversampled, **it only found 351 households** (of the 401 final sample randomly selected from the RNU list) who received benefits;
- There were also **multiple intervention types** (food, cash, nutrition supplements, livestock feed) by multiple implementing partners (GoS and the 6 NGOs from the Start Network), each providing different interventions in different locations which means that it was difficult to distinguish the effects of these different interventions from the ARC interventions and even though the survey asked the respondents about the number of distributions and the sources of support received, it is unlikely that the respondents would be able to give an accurate answer;
- There were 51 individuals who reported not receiving any assistance (86% of which were in Diourbel area) and three individuals reported receiving assistance several times (more than five times) who lived in Kolda. We do not know why these 51 individuals did not receive any assistance and thus, they are excluded from the analysis.

H.2 Start Network Data

The Start Network conducted **three rounds** of **independent monitoring survey (IM)** in June, July, and August 2020 (this was first planned as a face-to-face interview but due to COVID-19 these were converted to phone-based interviews) with randomised and representative sample of 850 beneficiaries per round (2,550 households in total) from the seven regions covered by the Start Network agencies on the assistance that they have received. The list of respondents used to generate this random sample was based on Agency Report form (the coverage database) that was

carried out prior to the interventions between January and April 2020 with households receiving support through ARC Replica pay-out. The short coverage instrument include geographical location of the household; sociodemographic characteristics (e.g. household size, age and gender of the head of the households, level of education, total number of children aged between 6 and 59 months; pregnant and lactating women, people with disabilities; number of people in working age group); number of beneficiaries of the ARC programme; sources of revenue; average household income; number of livestock owned; total area (in hectares) cultivated and/or planted by the household in the past season; and duration of household grain stocks.

Part of this coverage database comes from the RNU, which includes data on poor and vulnerable households who are beneficiaries of the National Programme of Family Security Benefits (Programme national de bourses de securite familiale - PNBSF). Similar to the Government of Senegal, the Start Network also used the RNU as a basis for the sampling process for the coverage survey, but our understanding is that they also updated the RNU based on the findings from the coverage survey as there faced some challenges in terms of the accuracy of the RNU database (we discuss this in more detail below). We did not obtain this coverage database from the Start Network. We had several discussions with the Start Network evaluation team and it was decided that it would be difficult to use this dataset as a 'baseline' and to merge it with the IM data which is the main focus of our analysis. There were also some doubts about the comparability of the data collected by the different agencies. Furthermore, due to the data privacy regulation in Senegal we would have had to obtain MOUs with all the agencies involved in the data collection exercise for this coverage data which would be too time-consuming and impractical to do. Therefore, we decided to only focus on the IM dataset.

The IM survey focussed on self-reported household-level effects of the drought as well as what effects the Start Network distributions might have made to mitigate negative outcomes in terms of food security and livelihood. The interviews were held a few weeks after the beneficiaries had received the assistance in order to give them sufficient time to assess the relevance, quality, and report back on behaviours that were undertaken after they received the assistance. The questions include:

- **Household demographics** (household size, composition, no. of pregnant and lactating women, no. of household members benefitting from cash transfer, and from fortified flour, main livelihood strategy, other forms of assistance received)
- **Receipt of money** (frequency, amount, mode of transfer, whether the amount is sufficient to cover basic needs (why/why not), preferred type of support, how did they use the money, who decides how to use the money, problems encountered as a result of the support).
- **Education/Awareness raising.**
- **Receipt of fortified flour** (amount in kg, their perception of quality of the flour, how did they use the flour, whether they sold the flour, satisfaction of the system, etc.).
- **Household food needs and dietary diversity** (meals eaten by different members of the household including children, pregnant/lactating women; food groups).
- **Accountability** (whether the distributions were done in a transparent and fair manner; whether anyone has tried to scam, abuse, or blackmail the respondent in relation to the support they received; and whether they had to pay a fee, work, or render a service in order to be included in the programme or to receive the items).

Table 17: Start Network Independent Monitoring Sample

INDEPENDENT MONITORING SAMPLE				
REGION	R1	R2	R3	TOTAL
DIOURBEL	141	110	110	361
KAFFRINE	151	115	115	381
KOLDA	0	192	190	382
LOUGA	136	102	103	241
MATAM	135	106	105	346
SAINT-LOUIS	144	110	110	364
THIÈS	159	111	110	380
TOTAL	**866**	**846**	**843**	**2555**

Source: ARC Replica Pay-out Senegal 2020 Internal Evaluation, December 2020.

The Start Network also carried out a number of other primary data collection exercises that we are not using for the quantitative analysis in this report. We briefly outline them here. The detailed results can be found in the Start Network's report.[83]

The Start Network collected **monthly qualitative data from 22 Sentinel sites** across Senegal both before, during, and after the lean season. They were undertaken through monthly phone calls with the community representatives or contact points (one in each community). The questions asked were about:

- **Support** that households in the community have received to help with the lean season in the past month (the type of support, sources, and timing of the support) and coping strategies of households for the lean season
- **Livestock & Agriculture**: Sick or dead livestock (type of animal, condition of animal that are not sick) and how households are coping with this, sales of livestock, grazing, planting.
- **Household Health and Food Security**: general health, prices and availability of food on local market, food supply, access to water for drinking and for livestock, and credits and loans.

Another qualitative dataset is **in-depth household interviews** (two unique households in each of the sixteen departments in which the Start Network distributed cash and flour) were carried out in September 2020. This qualitative data provides contextual understanding and complement the main household survey data. **Market survey tool** which recorded the prices of staple food and agricultural items at markets in the communities where support has been provided was also carried out to record the availability of these items. **Semi-structured interviews with member agencies and government stakeholders** regarding their experiences of the pay-out and project implementation as well as identifying key challenges and lessons learned from the process of providing assistance were also carried out pre-implementation, mid-implementation, and post-

[83] ARC Replica Pay-out Senegal 2020 Internal Evaluation, December 2020.

implementation. Finally, **post-distribution monitoring (PDM)** was carried out to collect feedback from the sample of supported households by individual agencies of the Start Network and two rounds were carried out. However, we did not use this data for the analysis in this report as it only focuses on the process which is similar to that of the Kimetrica household survey.[84]

For our analysis, **we focus on the IM survey**. Due to COVID-19 the IM questionnaire was shortened in order to make it suitable for a phone survey and relied on closed-response questions. The unprecedented effects of COVID-19 also mean that, similar to the Kimetrica study, it is not possible to conclusively attribute any change – particularly at household level – to the ARC Replica project specifically, entirely or even in part. This is exacerbated by the fact that the government's COVID-19 response fund targeted some of the same communities, and even some of the same households, for in-kind support during a similar time to when ARC Replica distributions took place. It was also noted that although every attempt was made to produce a random and representative sample for all data collected as part of the Start Network's pay-out evaluation, there were some limitations in achieving this. This was partly due to reliance on remote modalities as in some geographical areas respondents were less likely to have a mobile phone. Moreover, households without a mobile phone would be comparatively worse off than those who do, but were excluded from the phone-based survey.

[84] *Ibid.*

Annex I Quantitative analysis of household effects

I.1 Introduction

Building on the key findings from the Kimetrica's and Start Network's reports, the aim of our quantitative analysis is to examine additional aspects of the impacts of the ARC and ARC Replica distributions on the subjective outcome variables at household level. In particular, the extent to which household characteristics drive these outcomes. The main research questions explored are:

1. Who benefitted from the distributions and how does this vary across different types of households (e.g. male/female-headed household, household size, sources of support, etc.)?
2. To what extent have the distributions improved the livelihood of the households?
3. Are households able to smooth their consumption as a result of the support received? In other words, to what extent do the distributions sufficiently help sustain the respondents' livelihood?

We have conducted the analysis with Kimetrica data and the Start Network data separately as it is not possible to merge the two datasets since the two surveys had different purposes, different geographical coverages, and a different sampling frame.

I.2 Descriptive Statistics

I.2.1 Kimetrica Dataset

First, we explore the Kimetrica dataset. We examine the breakdown of the number of households who received the support in each region and by household characteristics including gender, household sizes, average number of pregnant woman, average number of breast-feeding women, average number of children 6-59 months, number of households stated that they had been affected by drought in the past 12 months, number of households stated that they had been affected by COVID-19 (to gauge the level of needs by region), frequency of the distribution, and type of support received by region/department (food, cash, flour, none). An important caveat here is that the sample size is on the small side once we break the data down to look at these household characteristics. However, in order to understand 'who' benefit from the distributions, we think it is still worth exploring.

As shown in Table 18 across all regions most of the households included in the sample reported that they were affected by both drought and COVID-19. All households reported to have on average at least one child aged between 6 and 59 months and average household size is around 12 (which is slightly larger than that reported elsewhere)[85]. The types of support received varied across different regions. Furthermore, we find that not all departments in the same region received the same types of support, although the sample size at department level is very small.

[85] According to the Pauvrete et Structure Familiale (PSF) survey, the average household size of poor household is 8.09 – see De Vreyer, P. and Lambert, S. (2020). Inequality, Poverty and the Intra-Household Allocation of Consumption in Senegal, World Bank Policy Research Working Paper 9121, January.

Table 18: Distribution of the households who received support from ARC and ARC Replica by region and by department (Kimetrica data)

Region/ Dept	Obs.	M %	F %	Ave. HH size	Ave (mean)no. preg women/ hh	Ave (mean) no. breast-feeding women/ hh	Ave (mean) no. of children 6-59 months/ hh	% hh affected by drought	% of hh affected by COVID	Mean Freq of dist.	Food % of hh	Cash % of hh	Flour % of hh
Diourbel (region)	**118**	**57.6**	**42.4**	**12.1**	**0.41**	**0.78**	**2.94**	**86.5**	**82.4**	**1.68**	**27.1**	**40.7**	**15.3**
Bambey	22	59.1	40.9	13.3	0.18	0.91	3.41	81.8	72.7	2	36.4	100	50
Diourbel	41	56.1	43.9	12.5	0.32	0.66	2.71	95	100	1.05	100	0	0
Mbacke	55	58.2	41.8	11.4	0.56	0.82	2.93	84.4	78.1	1.84	12.5	81.2	21.9
Kaffrine (Region)	**116**	**45.7**	**54.3**	**12.1**	**0.38**	**0.93**	**2.41**	**89.7**	**94**	**1.95**	**97.4**	**28.4**	**0**
Kaffrine	20	30	70	11.6	0.3	0.95	2.35	100	85	3.2	95	75	0
Birkilane	49	61.2	38.8	12.6	0.31	1.02	2.84	79.6	95.9	1.78	95.9	34.7	0
Koungheul	47	36.2	63.8	11.9	0.49	0.83	2	95.7	95.7	1.60	100	2.1	0
Kolda (Region)	63	65.1	34.9	11.6	0.52	0.95	2.59	89.3	94.6	2.71	14.3	69.8	6.3
Kolda	8	62.5	37.5	13.6	1	1.12	5.25	75	75	2.38	0	12.5	0
MYF	49	67.3	32.7	11	0.47	0.98	2.16	90.5	97.6	2.90	2.4	28.6	7.1
Velingara	6	50	50	13.2	0.33	0.5	2.5	100	100	1.83	0	83.3	16.7
Louga (Region)	**104**	**27.9**	**72.1**	**12**	**0.28**	**0.77**	**2.54**	**56.7**	**100**	**1.33**	**73.1**	**24.0**	**16.3**
Louga	43	9.3	90.7	11.5	0.21	0.56	1.88	0	100	1	100	2.3	0
Kebemer	43	44.2	55.8	13	0.35	0.84	2.72	95.3	100	1.40	65.1	18.6	16.3
Linguere	18	33.3	66.7	11	0.28	1.11	3.67	100	100	1.94	27.8	72.2	55.6

Next, we explore (Table 19) **the distribution of the support across different regions by sources**. Although it is important to note that this was based on self-reported data. That is, the respondents were asked to indicate where they thought the support was coming from. It is unlikely that the respondents would be able to answer this question with complete accuracy. It would have been better to have accurate and objective (rather than self-reporting) M&E data to assess the extent to which the support from different sources has reached the intended beneficiaries, which is something that should be considered for future ARC interventions.

Based on this self-reported data, except for Kolda and Diourbel, the respondents reported that they received the support package from the government. In Diourbel, the respondents reported receiving almost equal proportion of the support from the government, ARC (included both ARC and ARC Replica support), and from NGOs. Bambey and MBacke were the only two departments (both in Dibourbel) that we observe quite significant proportions of respondents reported receiving support from ARC (36.4% and 43.8% respectively). In other regions and departments, most respondents reported that they received the support from either the government (COVID-19 response) or NGOs. Although in Kolda, most respondents thought they received the support from NGOs rather than the government. It is possible that their perception of where the support was influenced by the presence of the local government or NGOs in that region and how active these organisations are. Since this is self-reporting data and there is no M&E data which records the actual sources of support received by each household, we unable to evaluate the impact of the support by sources. We present this data to highlight the importance of having a proper M&E system that can record the true sources of support rather than relying on self-reporting data which are unlikely to be accurate.

Table 19: Sources of support by region/department (total N = 401)

Region/Dept	Obs.	National Govt.* (%)	UN (%)	ARC** (%)	NGOs (%)	Other (%)	Don't know (%)
Diourbel	118	39.2	0	35.1	31.1	1.4	5.4
Kaffrine	116	93.1	0	0	12.9	0	4.3
Kolda	63	14.3	0	1.8	78.6	1.8	7.1
Louga	104	58.7	0	0	23.1	0	20.2

Note: *National Government is COVID-19 support; **ARC means ARC and ARC Replica

I.3 Addressing the research questions

In this section, we turn to our three main research questions and try to address these questions by triangulating our own empirical analysis (descriptive statistics and regression analysis) and existing results from Kimetrica and Start Network reports.

I.3.1 Research Question 1: Who benefitted from the distributions and how does this vary across different types of households?

I.3.1.1 Kimetrica Dataset

We examine the (self-reported) outcomes by household size and since the Kimetrica questionnaire asked respondents (who received both ARC and ARC Replica supports and GoS COVID-19 response support) to report the outcomes for each type of support i.e. food (Table 20), cash (Table 21), flour (Table 22). These outcome variables include the following questions:

(i) Has the (cash/food) distribution helped your household avert suffering? (**avert suffering**)

(ii) Has the (cash/food) distribution helped your household meet monthly food requirements? (**food requirements**)
(iii) Has the (cash/food) distribution helped improve household food consumption? (**food consumption**)
(iv) Has the (cash/food) distribution prevented the distress sale of livestock and other assets? (**livestock/assets**)
(v) Has the (cash/food) distribution prevented migration of family members to cities in search for work? (**migration**)
(vi) Has the (cash/food) distribution prevented the household from taking kids out of school? **(school**)
(vii) Has the (cash/food) distribution helped reduce debt? (**reduce debt)**

It seems that the impact of food distribution is positive across all household sizes particularly, as expected, in terms of helping them with monthly food requirements and food consumption. It also appears to help prevent distress sale of livestock/asset and reduce debt. However, receiving food is less likely to prevent family members migrating to a different city to look for work or in keeping children in school (Table 20).

It is interesting to note that we do not observe any variation in the outcomes across household sizes. One would have expected that given the cap in the amount of food and cash transfers, larger households would have struggled to reap the same level of benefit as smaller households. However, we do not see this in the data. This could be due to the fact that households received multiple supports from different sources and thus, larger households were able to sustain their needs through other forms of support.

Table 20: Outcomes by household size – food

House-hold sizes	Obs.	Avert suffering	Food requirements	Food consumption	livestock/ assets	migration	school	Reduce debt
1-9	76	100.0	100.0	98.7	92.1	77.6	80.3	98.7
10-14	72	100.0	100.0	100.0	93.1	72.2	75.0	100.0
15-19	42	100.0	97.6	97.6	88.1	83.3	83.3	97.6
20 or more	32	100.0	96.9	100.0	78.1	50.0	71.9	90.6

Table 21: Outcomes by household size – cash

House hold sizes	Obs.	Avert suffering	Food requirements	Food consumption	livestock/ assets	migration	school	Reduce debt
1-9	44	100.0	97.7	93.2	81.8	77.3	75	100.0
10-14	47	95.7	100.0	89.4	91.5	85.1	83.0	97.9
15-19	18	100.0	94.4	88.9	94.4	88.9	77.8	100.0
20 or more	12	100.0	100.0	100.0	100.0	75.0	75.0	100.0

Table 22: Outcomes by household size – flour

House hold sizes	Obs.	Avert suffering	Food requirements	Food consumption	livestock/ assets	migration	school	Reduce debt

1-9	11	100.0	90.9	72.7	72.7	54.5	36.4	90.9
10-14	14	100.0	100.0	100.0	85.7	85.7	85.7	100
15-19	10	100.0	100.0	80.0	70.0	60.0	50.0	100
20 or more	4	100.0	100.0	100.0	50.0	50.0	50.0	100

Receiving cash also helped households meet their food requirements and food consumption, helped reduce their debt, and prevent distress sale of livestock and assets. But similar to food support, it is less likely to prevent family member migrating to a different city to look for more work or to help them keep their children in school. These effects are similar across all household sizes. The larger household sizes seem to be less likely to report avoiding taking children out of school and migration, which may reflect issues around the per capita value of transfers both in terms of cash and food distributions.

Receiving fortified flour also helped with food requirements and consumption as well as helped reduce debt (although the relationship is unclear), but it is less helpful in preventing the sale of livestock and other assets, migration of family member to another city for more work, and did not seem to help much with keeping children in school. Again, one important caveat here is the small sample size, especially for those receiving flour and thus, it is difficult to extrapolate this result to the overall effects of the distributions. We conduct this exercise to see if there is any indication in terms of variation in the impact by household size and type of support. It seems that the impact does not vary across household sizes. **The main positive effects across all types of support and household sizes are on helping households with monthly food requirements and supplementing food consumption as well as repaying their debt.**

We also examine the differences between 'expected' and 'received' support which was asked in the Kimetrica survey; and the self-reported outcomes. The respondents were asked what they expected to receive and what they actually received with respect to food items. We examine whether these differences affect the perceived benefit of the support. Our conjecture is that respondents who reported to have received less than expected, would report less benefit for the support. On the other hand, those who received what they expected or received more than expected, would report that the support they received was beneficial in terms of preserving their livelihood. Most of the respondents in the Kimetrica sample appeared to have received what they expected and only a few reported 'negative' (receiving less than expected) or 'positive' (receiving more than expected) differences and its seems that most respondents felt that the support they received helped them reduce the use of negative coping strategies.

I.3.1.2 Logistic Regression analysis

Next, to explore the data further in terms of who benefit from the support, we carry out a logistic regression (for binary dependent variables) to examine the effect of receiving the distribution on the outcome variables, controlling for household characteristics. We choose the logistic regression method as it is well suited for describing and testing hypotheses about relationships between a categorical outcome variable and one or more categorical predictor/independent variables, which is the structure of both our datasets.

Logistic regression applies the logit transformation to the dependent variable i.e. the logistic model predicts the logit of *Y* from *X.* The logit is the natural logarithm (ln) of odds of *Y*, and odds are ratios

of probabilities (π) of *Y* happening (in this case, that children stay in school) to probabilities (1- π) of *Y* not happening (that children drop out of school). The simple logistic model has the form[86]:

$$logit\ (Y) = natural\log(odds) = ln\left(\frac{\pi}{(1-\pi}\right) = \alpha + \beta X \qquad (1)$$

In our case, *X* is an independent variable. Taking the antilog of Equation 1 on both sides, one derives an equation to predict the probability of the occurrence of the outcome of interest as follows:

$$\pi = Probability\ (Y = outcome\ of\ interest|X = x, a\ specific\ value\ of\ X) = \frac{e^{\alpha+\beta x}}{1+e^{\alpha+\beta x}} \text{ (2)}$$

where π is the probability of the outcome of interest or "event", such as a child staying in the school, α is the *Y* intercept, β is the regression coefficient, and *e* = 2.71828 is the base of the system of natural logarithms. *X* can be categorical or continuous, but *Y* is always categorical. According to Equation 1, the relationship between logit (*Y*) and *X* is linear. Yet according to Equation 2, the relationship between the probability of *Y* and *X* is non-linear. For this reason, the natural log transformation of the odds in Equation 1 is necessary to make the relationship between a categorical outcome variable and its predictors linear. The value of the coefficient β determines the direction of the relationship between *X* and the logit of *Y*. When β is greater than zero, larger (or smaller) *X* values are associated with larger (or smaller) logits of *Y.* Conversely, if β is less than zero, larger (or smaller) *X* values are associated with smaller (or larger) logits of *Y*. Within the framework of inference statistics, the null hypothesis is that β equals zero, or there is no linear relationship in the population. Rejecting such a null hypothesis implies that a linear relationship exists between *X* and the logit of *Y*. If a predictor is binary, then the odds ratio is equal to *e*, the natural logarithm base, raised to the exponent of the slope β (e^{β}).

Extending the logic of the simple logistic regression to multiple predictors (or a vector of independent variables as described above), we have a more complex logistic regression of *Y* as follows:

$$logit(Y) = ln\left(\frac{\pi}{1-\pi}\right) = \alpha + \beta_1 X_1 + \beta_2 X_2 \quad (3)$$

Therefore,

$$\pi = Probability\ (Y = outcome\ of\ interest|X_1 = x_1, X_2 = x_2) = \frac{e^{\alpha+\beta_1 X_1+\beta_2 X_2}}{1+e^{\alpha+\beta_1 X_1+\beta_2 X_2}} \text{ (4)}$$

Where π is once again the probability of the event, α is the *Y* intercept, βs are regression coefficients and *X*s are a set of predictors/independent variables. α and βs are typically estimated by the maximum likelihood (ML) method, which is designed to maximise the likelihood of reproducing the data given the parameter estimates. The null hypothesis underlying the overall model states that all βs equal zero. A rejection of this null hypothesis implies that at least one β

[86] Peng, C-Y. J., K.L Lee, and G.M. Ingersoll (2002) "An Introduction to Logistic Regression Analysis and Reporting", *Journal of Educational Research*, volume 96, issue 1.

does not equal to zero in the population. The interpretation of results I rendered using the odds ratio for both categorical and continuous predictors.

The first set of outcome variables under consideration here are self-reported outcomes from the Kimetrica dataset as shown in Table 23. With data limitations and lack of a comparison group, it is important to highlight that we carry out this analysis as a descriptive exercise rather than trying to identify any causal relationship since we are not able to disentangle the effects of ARC and ARC Replica from the COVID-19 response and other support from NGOs. We present indicative results whether any correlation exists between some household characteristics and outcomes.

Table 23: Frequency table of the main outcome variables

Outcome variables	N	Yes	No	N/A
Avert suffering	401	222 (55.4%)	0	179 (44.6%)
Helped with monthly food requirements	401	220 (55.4%	2 (0.5%)	179 (44.6%)
Improved food consumption	401	220 (55.4%	2 (0.5%)	179 (44.6%)
Livestock	401	199 (49.6%)	23 (5.7%)	179 (44.6%)
Migration	**401**	**162 (40.4%)**	**60 (15%)**	**179 (44.6%)**
Education	**401**	**173 (43%)**	**49 (12.2%)**	**179 (44.6%)**
Debt reduction	401	217 (54.1%)	5 (1.2%)	179 (44.6%)

Note: households can receive more than one type of aid.

With the exception of variables ‘migration’ (reducing the need to migrate to a different city in search for a job) and ‘education’ (reducing the risk of school drop-out), the distribution of the other variables is too skewed to carry out a regression analysis (there is insufficient variation in the data). Therefore, we will carry out analyses with these two variables as dependent variables.

Independent or explanatory variables included are:

(i) HH characteristics
   a. Geographical location (region)
   b. Gender of the head of household (male/female)
   c. Household size (number of people living in the household: 3-5, 5-10, 10-15, 15 or more)
   d. Having pregnant women living in the household (yes/no)
   e. Having breast-feeding women living in household (yes/no)
   f. Number of children living in household (0, 1-2, 2-5, 6 or more)

(ii) Cash received (yes/no)
(iii) Frequency of the food distribution (1,2, 3 or more)
(iv) Drought impact reported (yes/no)
(v) COVID-19 impact (yes/no)
(vi) Type of assistance preferred (cash, food, others)
(vii) Number of aid/support received (0, 1, 2 or more)

We want to know the effect of the explanatory variables listed above on reducing the risk of school drop-out among children in households that have received food aid (we use both ARC and ARC Replica, N =222). The dependent variable takes the value of 1 if the respondent answered 'yes' to the question: "*Has the (cash/food) distribution prevent the household from taking kids out of school*?" and 0 if the respondent answered 'no'. Therefore 1 represents positive outcomes.

For our first regression, the dependent variable, *Y*, is the log of the odds of a child staying in school and *X*s are gender of the head of the household (female = 0 (ref group), male = 1); household size (less than 5, 6-10 (ref group), 11-15, 16+); whether the household has pregnant women (no = 0 (ref group), yes =1); whether the household has any lactating/breastfeeding women (no = 0 (ref group), yes =1); number of children in the household (none, 1-2 (ref group), 3-5, 6+); frequency of food distribution (once (ref group), twice, 3+); whether the household experienced drought impact (yes = 1 (ref group), no = 0); number of distributions received (1 (ref group), 2+);

We test nine different models (Table 24) and select one that best fits the data using the Akaike Information Criterion (AIC). Model 1 is the most basic model with only the gender of the head of household and household size enter the regression. For each of the subsequent models an additional independent variable is added. For the choice of model, we opt for the one that minimises the AIC criterion, i.e. the model 9.

Table 24: Logistic regression results (odds of a child staying in school)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Intercept	-0.948*** (0.256)	-0.912*** (0.262)	-0.772** (0.278)	-0.706 (0.331)	-0.545 (0.341)	-1.334** (0.413)	-1.317** (0.420)	-0.405 (0.479)	-1.047** (0.365)
Head of HH									
Female	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Male	-0.615 (0.377)	-0.610 (0.377)	-0.545 (0.382)	-0.427 (0.387)	-0.420 (0.394)	-0.258 (0.422)	-0.278 (0.424)	0.365 (0.487)	
HH size									
Less than 5	-0.710 (0.804)	-0.682 (0.805)	-0.721 (0.808)	-0.762 (0.809)	-0.766 (0.819)	-0.972 (0.872)	-1.175 (0.883)	-1.337 (0.896)	
6-10	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
11-15	-0.423 (0.410)	-0.381 (0.415)	-0.274 (0.423)	-0.213 (0.430)	-0.333 (0.442)	-0.285 (0.478)	-0.301 (0.489)	-0.256 (0.512)	
16+	0.193 (0.417)	0.237 (0.423)	0.377 (0.437)	0.713 (0.476)	0.662 (0.495)	0.547 (0.544)	0.366 (0.559)	0.596 (0.616)	
Pregnant woman									
No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Yes		-0.246 (0.395)	-0.143 (0.402)	-0.113 (0.409)	-0.139 (0.417)	-0.172 (0.451)	-0.225 (0.474)	-0.167 (0.498)	
Breast-Feeding									
No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Yes			-0.499 (0.358)	-0.365 (0.371)	-0.260 (0.37782)	-0.245 (0.4064)	-0.243 (0.4154)	-0.375 (0.440)	
Child									
None				-0.135 (0.495)	-0.285 (0.500)	-0.5144 (0.541)	-0.6408 (0.556)	-0.686 (0.607)	
1-2	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref

3-5				-0.507 (0.408)	-0.61392 (0.422)	-0.7919 (0.466)	-0.8132 (0.482)	-0.938 (0.503)	
6+				-1.9439 (1.1112)	-2.07176 (1.11838)	-1.8944 (1.1716)	-1.9599 (1.1783)	-2.188 (1.235)	
Freq of food dist.									
Only once	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Twice					0.022 (0.447)	0.500 (0.496)	-0.830 (0.795)	-0.260 (0.856)	-0.436 (0.800)
3+					-16.467 (949.60)	-15.943 (926.921)	-17.550 (914.091)	-16.660 (920.756)	-16.456 (962.088)
Drought impact									
Yes	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
No						1.906*** (0.391)	1.951 *** (0.399)	1.341** (0.447)	1.309** (0.417)
No. of type of support received									
One	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
2+							2.0580* (0.808)	2.227* (0.875)	2.035* (0.818)
Region									
Diourbel									
No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Yes								-1.523* (0.688)	-1.465* (0.631)
Kaffrine									
No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Yes								-2.120*** (0.570)	-1.891*** (0.512)
AIC	238.09	239.69	239.72	240.74	235.95	212	206.37	194.35	**188.14**
Wald Chi-2	6.260	6.657	8.630	13.606	22.399	48.356	55.977	72.002	60.212
LRT (Likelihood Ratio Test)	0.180	0.247	0.195	0.137	0.021	2.70976e-06	2.719692e-07	1.960e-09	4.076e-11
No. Obs	222	222	222	222	222	222	222	222	222

Note: standard errors in parentheses

Interpretation of the coefficients (the odd ratios):

We calculate the odd ratios of the coefficients which are significant in Model 9, which minimises the AIC criterion. The interpretation of the results (odd ratios) in Table 25 is as follows:

- With the support received, all other things being equal, households who reported that they were not impacted by the drought are 3.7 times more likely to be able to keep their children in school compared to households that have been impacted by the drought.
- Households that received at least two rounds of support are 7.6 times more likely to keep their children in school compared to households that received only one round of support.
- Living in the Diourbel region reduces the chances of keeping children in school by 77%.
- Living in the Kaffrine region reduces the chances of keeping children in school by 85%.[87]

[87] The regional effects should be interpreted with caution as they are likely to be biased by omitted variables.

Table 25: Odd ratios of Model 9 (odds of a child staying in school)

Var	Estimate	Std. Error	Z value	Odd ratio	2.50%	97.5%	p-value
Intercept	-1.047	0.365	-2.868	0.351			0.004**
Freq of food dist.							
Only once	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Twice	-0.436	0.800	-0.545	0.647			0.586
3+	-16.456	962.088	-0.017	7.134e-08			0.986
Drought impact							
Yes	Ref	Ref	Ref	Ref	Ref	Ref	Ref
No	1.309	0.417	3.138	3.702			0.002**
No. of type of support received							
One	Ref	Ref	Ref	Ref	Ref	Ref	Ref
2+	2.035	0.818	2.486	7.651			0.013*
Diourbel							
No	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Yes	-1.465	0.631	-2.322	0.231			0.020*
Kaffrine							
No	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Yes	-1.891	0.512	-3.695	0.151			0.0002***

Note: *statistically significant at 10%, ** at 5%, *** at 1% respectively

We also ran the same regression but replaced number of type of support received with a variable which records whether a household received cash or not. But this variable was not statistically significant.

Next we examine at **the second outcome variable, 'migration'** (recall that the question asked was "has the (cash/food) distribution prevent migration of family members to cities in search for work?" yes = 1 and no = 0). We run the same specification of the logistic regression model with the same covariates (Table 26).

Table 26: Logistic regression results (dependent var = the odds of not having to migrate to another city to look for a job)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
	Coef (Std Error)	Coef (Std Error)	Coef (Std Error)	Coef (Std Error)	Coef (Std Error)	Coef (Std Error)	Coef (Std Error)	Coef (Std Error)	Coef (Std Error)
Intercept	-0.957*** (0.253)	-0.898** (0.258)	-1.048** (0.350)	-1.092** (0.381)	-0.895* (0.397)	-1.522*** (0.446)	-1.521*** (0.447)	-0.910 (0.495)	-0.766*** (0.265)
Head of HH									
Female	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Male	-0.240 (0.335)	-0.230 (0.335)	-0.200 (0.339)	-0.112 (0.346)	-0.046 (0.351)	0.120 (0.374)	0.123 (0.374)	0.555 (0.427)	
HH size									
<=5	-0.337 (0.693)	-0.293 (0.695)	-0.309 (0.696)	-0.421 (0.706)	-0.441 (0.711)	-0.506 (0.744)	-0.540 (0.742)	-0.788 (0.767)	
6-10	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
11-15	-0.288 (0.386)	-0.212 (0.391)	-0.166 (0.398)	-0.094 (0.408)	-0.101 (0.415)	-0.030 (0.443)	-0.0391 (0.444)	0.01 (0.465)	
16+	0.633 (0.389)	0.718 (0.397)	0.777 (0.409)	1.111* (0.450)	1.041* (0.455)	1.005* (0.488)	0.958 (0.491)	1.037* (0.529)	
Pregnant woman									
No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Yes		-0.432 (0.372)	-0.391 (0.378)	-0.327 (0.384)	-0.302 (0.387)	-0.441 (0.414)	-0.440 (0.415)	-0.391 (0.438)	
Breast-Feeding									
Yes	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
No			0.215 (0.333)	-0.011 (0.355)	-0.070 (0.359)	-0.131 (0.380)	-0.127 (0.380)	-0.164 (0.403)	
Child									
None				0.682 (0.461)	0.567 (0.467)	0.4676 (0.497)	0.441 (0.499)	0.609 (0.542)	
1-2	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
3-5				-0.085 (0.381)	-0.082 (0.388)	-0.164 (0.417)	-0.165 (0.418)	-0.242 (0.443)	
6+				-1.108 (0.750)	-1.124 (0.751)	-0.905 (0.787)	-0.896 (0.788)	-1.166 (0.862)	
Freq of food dist.									
Only once	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Twice					-0.550 (0.451)	-0.203 (0.479)	-0.540 (0.645)	-0.172 (0.713)	
3+					-1.053 (0.800)	-0.570 (0.817)	-0.994 (0.971)	0.326 (1.064)	
Drought impact									
Yes	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
No						1.622*** (0.357)	1.627 (0.358)	1.220** (0.407)	1.194*** (0.357)
No. of type of support received									
One	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
2+							0.554*** (0.665)	0.368 (0.725)	

Diourbel									
No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Yes								0.054 (0.538)	
Kaffrine									
No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Yes								-1.899*** (0.516)	-1.651*** (0.390)
AIC	262.97	263.57	265.15	266.31	267	247.38	248.67	231.45	216.92
Wald Chi-2		7.517	7.934	12.774	16.089	37.705	38.416	59.64	48.163
LRT (Likelihood Ratio Test)		0.185	0.243	0.173	0.138	0.0002	2.307e-08	2.908e-07	3.480e-11
No. Obs	222	222	222	222	222	222	222	222	222

Note: standard errors in parentheses

For the choice of model, we opted for the one that minimises the AIC criterion, i.e. Model 9.

Thus, we have the following results (interpretation of the odd ratios) as shown in Table 27:

- Drought impact: with the support received, other things being equal, households that are not affected by the drought are 3.3 times more likely not to resort to migrating to another city to look for more work, compared to household that are affected by the drought.
- Living in the Kaffrine region reduces the likelihood of resorting to migration by 81%.[88]

Table 27: Odd ratios of Model 9 (dependent var = the odds of not having to migrate to another city to look for a job)

Variable	Estimate	Std. Error	Z value	Odd ratio	2.50%	97.5%	p-value
Intercept	-0.766	0.265	-2.888	0.465	0.272	0.773	0.004**
Drought impact							
Yes (Ref)	Ref	Ref	Ref	Ref	Ref	Ref	Ref
No	1.194	0.357	3.339	3.299	1.641	6.688	0.0008***
Kaffrine							
No	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Yes	-1.651	0.391	-4.228	0.192	0.086	0.402	2.358e-05***

Note: *statistically significant at 10%, ** at 5%, *** at 1% respectively

I.3.1.3 Start Network Dataset

For the Start Network regression (Table 28), the dependent variable, *Y*, is the log of the odds of the respondent having enough food to meet the needs of the household and *X*s are gender of the head of the household (female = 0 (ref group), male = 1); household size (1-5, 6-10 (ref group), 11-15, 16+); whether the household has pregnant women (no = 0 (ref group), yes =1); whether the household has any lactating/breastfeeding women (no = 0 (ref group), yes =1); number of children in the household (none, 1-2 (ref group), 3-4, 5-6, 7+); amount of cash received (0-USD60, USD61-120, USD121-200, USD201-240, USD241+); whether the household experienced drought impact (yes = 1 (ref group), no = 0); percentage of cash received spent on food (less than 75%, more than 75%); enriched flour received (yes = 1, no = 0); reported change in the price of basic foodstuffs over the past month (increased = 1, stable/decreased =0); reported change in household income

[88] The regional effects should be interpreted with caution as they are likely to be biased by omitted variables.

over the past month (stable, increase, decrease); and other assistance received by the household (yes =1, no=0).

Table 28: Logistic regression results (dependent var = the odds of having enough food for the household's needs), odd ratios reported in this table

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Odd ratio (St Err)	Odd ratio (St Err)	Odd ratio (St Err)	Odd ratio (St Err)	Odd ratio (St Err)	Odd ratio (St Err)
Intercept	1.121 (0.315)	0.768 (0.343)	0.614 (0.363)	0.481* (0.373)	0.974 (0.409)	1.005 (0.205)
Head of HH						
Female	Ref	Ref	Ref	Ref	Ref	Ref
Male	1.234* (0.095)	1.225 (0.097)	1.219 (0.102)	1.227* (0.104)	1.182 (0.1077)	1.178 (0.107)
HH size						
1-5	Ref	Ref	Ref	Ref	Ref	Ref
6-10	0.996 (0.310)	1.051 (0.322)	0.955 (0.337)	0.964 (0.344)	0.903 (0.351)	
11-15	1.075 (0.317)	1.159* (0.330)	1.168 (0.346)	1.156 (0.353)	1.044 (0.361)	
16+	0.929 (0.326)	0.923 (0.340)	0.906 (0.356)	0.914 (0.364)	0.855 (0.372)	
Pregnant woman						
No	Ref	Ref	Ref	Ref	Ref	Ref
Yes	1 (0.100)	0.985 (0.102)	0.981 (0.106)	0.997 (0.108)	1.040 (0.112)	
Breast-Feeding						
Yes	Ref	Ref	Ref	Ref	Ref	Ref
No	1.248* (0.112)	1.241 (0.114)	1.253 (0.118)	1.273* (0.120)	1.161 (0.124)	
Child						
None	0.748 (0.202)	0.775 (0.206)	0.736 (0.216)	0.843 (0.219)	0.832 (0.226)	0.882 (0.216)
1-2	Ref	Ref	Ref	Ref	Ref	Ref
3-4	0.899 (0.114)	0.898 (0.116)	0.884 (0.121)	0.868 (0.123)	0.868 (0.127)	0.85 (0.119)
5-6	1.109 (0.155)	1.149 (0.158)	1.187 (0.164)	1.195 (0.168)	1.230 (0.172)	1.154 (0.153)
7+	0.717 (0.238)	0.704 (0.242)	0.658 (0.254)	0.671 (0.259)	0.681 (0.264)	0.616* (0.241)
Cash received						
0-60$		0.663 (0.239)	0.707 (0.249)	0.774 (0.252)	0.871 (0.261)	0.868 (0.258)
61-120	Ref	Ref	Ref	Ref	Ref	Ref
121-200		1.884** (0.203)	1.721* (0.212)	1.404 (0.218)	1.853** (0.232)	1.843** (0.229)
201-240		1.756*** (0.116)	1.711*** (0.121)	1.284 (0.128)	1.706*** (0.161)	1.688** (0.160)
241$+		0.889 (0.126)	0.904 (0.132)	0.732* (0.137)	0.958 (0.153)	0.951 (0.152)
% cash received spent on food						

<= 75%	Ref	Ref	Ref	Ref	Ref	Ref
> 75%		1.387*** (0.094)	1.385*** (0.099)	1.269* (0.101)	1 (0.108)	
Received flour						
No	Ref	Ref	Ref	Ref	Ref	Ref
Yes				2.143*** (0.120)	1.437* (0.168)	1.426* (0.167)
Price change						
Increase	Ref	Ref	Ref	Ref	Ref	Ref
Stable/Decrease			0.745** (0.104)	0.735** (0.107)	0.789* (0.11)	0.791* (0.110)
Income change						
Decrease	Ref	Ref	Ref	Ref	Ref	Ref
Increase			3.951*** (0.127)	3.885*** (0.129)	3.693*** (0.133)	3.658*** (0.133)
Stable			1.062 (0.113)	0.976 (0.115)	1.041 (0.12)	1.042 (0.119)
Received other assistances						
No	Ref	Ref	Ref	Ref	Ref	Ref
Yes				1.679*** (0.101)	1.456*** (0.107)	1.46*** (0.107)
Region						
Kaffrine	Ref	Ref	Ref	Ref	Ref	Ref
Diourbel					1.689* (0.259)	1.691* (0.256)
Kolda					0.331*** (0.214)	0.325*** (0.212)
Louga					0.497** (0.226)	0.494** (0.225)
Matam					0.354*** (0.192)	0.3512*** (0.192)
Saint Louis					0.406*** (0.205)	0.397*** (0.203)
Thies					0.765 (0.193)	0.756 (0.191)
AIC	2704.2	2652	2493.7	2431.1	2353.4	**2345.4**
Ward chi 2	16.538	78.823	243.037	309.706	399.387	395.413
LRT (Likelihood Ratio Test)	0.085	1.15e-10	2.12e-41	8.38e-54	1.68e-68	1.83e-71
No. Obs	1971	1971	1971	1971	1971	1971

Note: *statistically significant at 10%, ** at 5%, *** at 1% respectively

As before, the model chosen is the one that minimises the AIC criterion, i.e. model 6 (Table 28 reports the odd ratios for each explanatory variables). Thus, it appears that the amount of money received, enriched flour received, price and income variations, other types of assistance received, and the region all have a significant influence on the odds that there is enough food to satisfy that needs of the household. The interpretation of the odd ratios is as follows:

- The likelihood of having enough food in the household decreases by 38% in households with seven or more children as compared to households with 1 or 2 children (although this is significant only at 10% level);

- The odds of having enough food in the household increase by 1.84 times in households that received an amount between $121 and $200 compared to households that received an amount between $61 and $120;
- The odds of having enough food in the household increase by 1.69 times in households that received between $201 and $240 compared to households that received between $61 and $120;
- The odds of having enough food in the household increase by 1.43 in households that received fortified flour compared to households that did not;
- Stable or falling prices increase the odds of having enough food in the household by 21% compared to households facing rising prices.;
- The chances of having enough food in the household increase by 3.6 in households that have experienced an increase in income compared to households that have experienced a decrease in income;
- The odds of having enough food in the household increase by by 1.4 in households that received other assistance compared to those that did not;
- Households in the Diourbel region are 1.7 times more likely to have enough food compared to households in Kaffrine (although this is only significant at 10% level);
- Households in Kolda are 70% less likely to have enough food than households in Kaffrine.
- The likelihood of having enough food decreases by 51% for households living in Louga, compared to households living in Kaffrine.
- The likelihood of having enough food decreases by 65% for households living in Matam, compared to households living in Kaffrine.
- The likelihood of having enough food decreases by 61% for households living in Saint Louis, compared to households living in Kaffrine.

These results are intuitive. Having more children in the household makes it more difficult to cater for the household's needs in terms of food consumption despite receiving the support from ARC Replica. Having more cash and having excess income help households sustain their needs. Our results confirm those presented in the Start Network pay-out report, although in the report it was also mentioned that any effects of distributions on dietary diversity were short-lived. Most households relied on simple meals consisting primarily of grains and legumes. When examining the number of meals consumed per day, their results suggested that children, pregnant women, and nursing women seemed to benefit from the distributions. But since each household could receive more than one distribution and/or type of support as mentioned above it is not possible to conclusively attribute the positive impact on food security to ARC Replica intervention alone. It was also pointed out in their report that the support was not received early enough to prevent households from needing to use negative coping strategies, although a reduction in the use of some coping strategies was observed (e.g. going a whole day without eating, children under 18 having to work, men in the household having to accept high-risk, social degrading, or exploitative jobs).

I.3.2 Research Question 2: To what extent have the distributions supported the livelihoods of the households? How well did the support match the needs?

I.3.2.1 Kimetrica survey data

In the Kimetrica report, respondents (who received the distributions from both ARC and ARC Replica plus the government's COVID-19 responses) reported that the distributions helped "preserve their livelihood". We explore all of the above outcome variables included in Kimetrica survey further. We further examine the effects of the distribution on the (self-reported) outcome variables.

First, we examine these outcome variables by type of assistance overall and then by region (broken down by type of assistance), then by sources of assistance, by household sizes, and by differences between 'expected' and received' support, which we explain further below. Table 32 shows the outcomes by type of assistance and it is worth noting that each household could receive more than one type of assistance (e.g. food and cash). The respondents, who received food support, reported that the distribution helped avert suffering (although the definition of this is unclear), that it has significantly helped meet their monthly food requirements, improved household food consumption, and reduced debt. To a slightly lesser extent, the food received has helped prevent distress sale of livestock and assets, prevent family members migrating to other cities in search for work, and helped keep their children in school. Similar results were reported for those who received cash and flour (although only a small number of households received flour, N=39). It appears that most of the positive outcomes are around helping with food consumption and reducing debt.

Table 29: Outcomes by types of support (N = 382), proportion of households saying 'yes' to experiencing positive outcomes

Types of support	Obs.	Avert suffering (%)	Food requirements (%)	Food consumption (%)	livestock/ assets (%)	Migration (%)	School (%)	Reduce debt (%)
Food	222	100	99.1	99.1	89.6	73	77.9	97.7
Cash	121	98.3	98.3	91.7	89.3	81.8	78.5	99.2
Flour	39	100	97.4	87.2	74.4	66.7	59.0	97.4

In most regions, in households that received food support the respondents reported that the support received helped "avert suffering", "helped meet monthly food requirements", "helped improve household food consumption", and "prevent the distress sale of livestock and other assets". To a lesser extent that the support helped "prevent migration of family members to cities in search for work" and "prevent households taking kids out of school", particularly lower in the Louga region (Table 30). For cash support, the effects are more or less equally positive across all the dimensions of outcomes (Table 31). For fortified flour which was only received by a small number of households in the sample (N=39), with the exception of Kaffrine, it seems that smaller proportions of households in Kolda and Louga found fortified flour helpful for distress selling of livestock, having to migrate to another city to find work, and keeping their children in school.

Table 30: Outcomes by regions: percentage of households that reported that the support helped to improve particular outcomes by region (N = 222) – food

Region/	Obs.	Avert suffering	Food requirements	Food consumption	livestock/ assets	Migration (%)	School (%)	Reduce debt

		(%)	(%)	(%)	(%)			(%)
Diourbel	32	100	96.9	100	90.6	59.4	84.4	93.8
Kaffrine	113	100	99.1	100	97.3	90.3	92	98.2
Kolda	1	100	100	100	100	100	100	100
Louga	76	100	100	97.4	77.6	52.6	53.9	98.7
Total	**222**	**100**	**99.1**	**99.1**	**89.6**	**73**	**77.9**	**97.7**

Table 31: Outcomes by regions: percentage of households that reported that the support helped to improve particular outcomes by region (N = 121) – cash

Region/ Dept	Obs.	Avert suffering (%)	Food requirements (%)	Food consumption (%)	livestock/ assets (%)	Migration (%)	School (%)	Reduce debt (%)
Diourbel	48	100	100	81.2	85.4	75	70.8	100
Kaffrine	33	100	93.9	97	90.9	84.8	72.7	100
Kolda	18	100	100	100	83.3	77.8	88.9	94.4
Louga	22	90.9	100	100	100	95.5	95.5	100
Total	**121**	**98.3**	**98.3**	**91.7**	**89.3**	**81.8**	**78.5**	**99.2**

We also examine the overall outcomes by type of support (food, cash, and flour) and the result suggests that all respondents who received the distribution reported that food helped avert suffering, supplement monthly food requirement, and helped to reduce the need to resort to negative coping strategies. Large proportions of those who received cash also reported positive outcomes across all the dimensions (Table 31), although to a slightly lesser degree than receiving food aid. Receiving flour also helped avert suffering, helped with monthly food requirement and consumption but less helpful in terms of negative coping strategies. However, it is worth noting here that households could receive more than one type of support. Therefore, it is impossible to clearly distinguish the impact of receiving only food, or only cash or only flour on these outcome variables.

Table 32: Outcomes by region and department (Kimetrica data)

Region/ Dept	Obs.	Avert suffering	Food requirements	Food consumption	livestock/ assets	migration	school	Reduce debt
Diourbel (region)	**118**	**100**	**96.9**	**100**	**90.6**	**59.4**	**84.4**	**93.8**
Bambey	22	100	100	100	100	87.5	100	100
Diourbel	41	100	95	100	90	55	95	90
Mbacke	55	100	100	100	75	25	0	100
Kaffrine (Region)	**116**	**100**	**99.1**	**100**	**97.3**	**90.3**	**92**	**98.2**
Kaffrine	20	100	100	100	100	89.5	100	100
Birkilane	49	100	100	100	93.6	83	80.9	95.7
Koungheul	47	100	97.9	100	100	97.9	100	100
Kolda (Region)	**63**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Kolda	8			100				
MYF	49	100	100	100	100	100	100	100
Velingara	6			100				
Louga (Region)	**104**	**100**	**100**	**97.4**	**77.6**	**52.6**	**53.9**	**98.7**
Louga	43	100	100	95.3	81.4	39.5	41.9	97.7
Kebemer	43	100	100	100	67.9	64.3	64.3	100

Linguere	18	100	100	100	100	100	100	100

I.3.2.2 Start Network dataset

Recall that the Start Network data that we use for the analysis is from the independent monitoring survey (IM), which was collected in June, July, and August 2020. The distribution of the sample across regions and departments is shown in Table 33. The overall sample is much larger than the Kimetrica sample and includes only households who received the support from ARC Replica in seven regions. The total samples across the regions are comparable: Diourbel (361), Matam (346), Saint-Louis (364), Louga (341), Thies (380), Kafrine (381), and Kolda (382), even though the data collection in Kolda started a month later than other regions.

Table 33: Distribution of households by data collection round, region and department

REGION	DEPARTMENT	ROUND 1 JUNE	ROUND 2 JULY	ROUND 3 AUGUST	TOTAL
DIOURBEL	BAMBEY	30	30	30	90
	MBACKÉ	111	80	80	271
MATAM	MATAM	90	75	75	240
	RANÉROU	45	31	30	106
SAINT-LOUIS	PODOR	144	110	110	364
LOUGA	KÉBÉMER	86	67	68	221
	LINGUÈRE	50	35	35	120
THIÈS	MBOUR	34	30	30	94
	THIÈS	75	46	45	166
	TIVAOUANE	50	35	35	120
KAFFRINE	BIRKILANE	20	20	20	60
	KAFFRINE	108	75	75	258
	MALEM HODAR	23	20	20	63
KOLDA	KOLDA	0	20	10	30
	MÉDINA YORO FOULA	0	53	47	100
	VÉLINGARA	0	119	133	252
TOTAL		866	846	843	2555

Source: ARC Replica Pay-out Senegal 2020 Internal Evaluation, December 2020.

Table 34: Average household size by region (N = 2555)

Region	Min	Mean	Max	Std. Dev.	N
Diourbel	3	14	120	9	361
Kaffrine	4	13	40	5	381
Kolda	2	14	76	7	382
Louga	1	13	40	7	341
Matam	5	13	42	6	346
Saint Louis	4	12	35	5	364
Thiès	4	13	43	6	380
Total	1	13	120	7	2533

The average household size by region is shown in Table 34. The maximum household sizes in all regions are very high which raise a question about data accuracy, although the mean/average household sizes in all regions seem comparable to Kimetrica dataset.

Recall that supported household received a total of 5,000 CFA ($9 USD) per household member and this is capped at eight household members per distribution. As such, the most a household could receive was 40,000 CFA ($72 USD) per monthly distribution or 120,000 CFA ($216 USD) in total, but in some cases, the amount received per distribution was slightly higher to account for fortified flour no longer being distributed. We further look at the geographical distribution of the amount of cash received by households across the seven regions (Table 35).

Table 35: Amount of cash reported to have received (in CFA)

Region	Min	10th Quantile	Mean	90th Quantile	Max	Std. Dev.	N	Ave amount per capita
Diourbel	10000	40000	85720	120000	130000	38907	361	6123
Kaffrine	20000	40000	90111	135000	148000	43079	381	6932
Kolda	5000	90000	112671	120000	120000	17863	382	8048
Louga	10000	30000	80340	120000	160000	39486	341	6180
Matam	20000	40000	96134	140000	150000	48036	346	7395
Saint Louis	5000	40000	92867	140000	145000	48030	364	7739
Thiès	0	40000	83518	128000	187000	41622	380	6424
Total	0	40000	91787	140000	187000	41744	2555	7061

The region in which households received the largest amount of cash on average is Kolda followed by Matam and Saint Louis. The lowest is in Thies where some households did not receive any cash. According to the results from the Start Network pay-out evaluation report, the IM survey asked the respondents whether or not the cash received was sufficient to meet their basic needs and the results showed that the trend varied between regions which is supported by our analysis in Table 35. Those who stated that the amount was insufficient were asked why that was the case. These respondents reported a number of challenges that they were facing including lack of other resources, large household size, increased food price, and that they shared the support with other households who did not receive it. We also look at the question which asked respondents whether the price of basic food over the past month has increased and 68.8% (1,759) reported that it has

increased, which could partly explain why the amount of cash received may not be sufficient. Moreover, the amount is capped at a maximum household size of eight members per household and thus, for larger household sizes it is unlikely to be sufficient.

According to the Start Network's FIP, the cash distribution was supposed to be capped at 40,000 CFA ($72 USD) per monthly distribution or 120,000 CFA ($216 USD) in total for a household with eight members who were eligible as beneficiaries for the ARC Replica intervention. Average household size in the Start Network survey data is 13, varying between 12 and 14 by region. This is similar to the average reported in the Kimetrica survey. Since the total amount a household could receive was capped well below the size of many households, the per capita value of the transfer varies a great deal and falls off very substantially for larger households, from around 23,000 CFA per capita for the smallest households to only around 6,000 for the largest (Table 36). This may be part of the reason that households reported that the cash was insufficient.

Table 36: Amount of cash received per household size (July and August survey rounds when the respondents have received the full payment)

HH size	% of HHs	US$0-60 (%)	US$61−120 (%)	US$121−200 (%)	US$201 −240 (%)	US$241 $+ (%)	Mean total amount received by HH / CFA	Mean per capita amount received / CFA	N
1-5	2.5	2.4	12.2	36.6	39	9.8	94,500	23,162	41
6-10	37.1	0.6	3.2	13.7	49.6	32.8	115,574	13,763	619
11-15	32.7	0.7	0.9	7.0	50.6	40.7	122,041	95,20	545
16+	27.8	0.2	1.1	5.6	59.6	33.5	129,450	5,986	463
Total		**0.6**	**2.1**	**9.8**	**52.5**	**35**	**118,850**	**10,449**	**1,668**

In the IM survey, respondents were asked how their household used the support their received and five most common responses given suggest that the money was primarily used to pay for food and improve food quality as well as other basic needs (Figure 7). This suggests that the amount was not sufficient for households to smooth their consumption over time or to help them with other needs.

When it comes to the timeliness of the support to help the households prepare for the lean season, overall, respondents reported that they received the money early enough. It was mentioned in the report that many vulnerable households do not prepare for the lean season, but instead rely on several different agricultural and/non-agricultural income-generating activities, depending on the season (although many of these activities were not possible or limited by COVID-19 restrictions). Some respondents stated that they used the cash received to repay debts and to manage immediate food security needs during the lean season (and to cope with the impact of the COVID-19 pandemic).

To explore this further, we examine the reported change in total household income over the past month and found that 40.7% of households (1,039 households) reported that their income has decreased, whilst 30.3% reported that it has not changed, and 29% (741 households) said their income has increased. We also look at whether households received other assistance (in addition to the support provided by ARC Replica) and 48.5% of respondents said yes (1,238 households). For those who reported having their income increased, it could be due to the fact that they had received other assistance. Therefore, we explore the cross-tabulation of income variation and whether households received other forms of assistance or not (Table 37). But it seems that there is

no clear relationship between income variation and other assistance. Some of those who received other assistance still reported that their income has decreased, and other households managed to increase their income even in the absence of other support.

Table 37: Cross-tabulation of income variation ("Stable", Increase", "decrease") and whether households received other assistance ("yes", "no")

Income variation/Others assist	Yes (%)	No (%)	N
Stable	51.3	48.7	775
Increase	48.6	51.4	741
Decrease	53.7	46.3	1039
Total	**51.5**	**48.5**	**2555**

In terms of usage of the fortified flour and the changes made due to having received fortified flour, it was reported that it was also only for short-term uses and mainly focussed on how the flour allowed children and nursing women in their household to eat better during that month.[89] Only 28.6% (730) reported to have received fortified flour.

Overall, it seems that both Kimetrica and Start Network's findings suggest that the distributions mainly helped households with food consumption/requirement and quality of the food. It is important to note that the way the question was framed was different in each study and of course, the sample of the respondents included in each study was different. The Kimetrica study involved a much smaller sample (401 respondents but only 351 received the distributions) and included both those who received the ARC (and COVID-19 response package) and those who received ARC Replica distributions. The Start Network study covered a much bigger sample (2,555 respondents) and only included those who received the support from ARC Replica. The key difference is the food support which was provided by the GoS and thus, included in the Kimetrica study which could explain why the results appeared to be more positive as it directly addressed food security issue. For the Start Network study, the question asked about 'changes' that the respondents were able to make and the options given were also different. Nevertheless, a clear common finding is that households used these distributions for food consumption and food security first, regardless of what they received. What is left (in terms of cash) is used to pay off debt and then to replace other negative coping strategies.

I.3.3 Research Question 3: Are households able to smooth their consumption as a result of the support received? In other words, to what extent do the distributions sufficiently help sustain the respondents' livelihood?

Building on the results from the Start Network pay-out evaluation which suggested that the amount of cash was not sufficient to meet all of the household's basic needs, we attempted to examine the extent to which the value of the distribution compares to an average monthly expenditure on consumption of *an equivalently poor households* in order to answer the final research question. This exercise has proved to be very challenging due to the lack of national survey data. There appears to be Senegal Poverty Monitoring Survey in 2011 (http://anads.ansd.sn/index.php/catalog/17), but the data is not publicly available.

[89] ARC Replica Pay-out Senegal 2020 Internal Evaluation, December 2020.

Our team was to search for other dataset e.g. micro data from the World Bank, the World Food Programme and other sources, but did we find price data for food items that were distributed at the time of the distribution. We also did not find average total consumption data per household or per capita. The only information we managed to find is average amount of consumption of rice for 2013, from a report by the WFP, which is 72.29 kg per person per year.[90] From the Kimetrica sample, respondents reported receiving 99.4kg of rice per household. If the data from the World Food Programme is correct (i.e. that each person consumes 72.29 kg of rice per person per year (around 6 kg per person per month), then for an average household size of 12, the 99.4kg would last just over one month (12 x 6kg per person per month = 72 kg per household per month). According to the International Food Policy Research Institute (IFPRI), the average consumption of rice per person per year in Senegal is 85 kg, which means the distribution would be depleted even faster.[91]

We also came across a website called numbeo.com,[92] which reports data on food prices in Senegal as well as cost of living, although we do not know their data collection method. According to this website, the price of white rice (per 1kg) is CFA 450 and the "daily recommended minimum amount of money for food per person is CFA 4,233.19 (around US$7.67, based on exchange rate of CFA1 = US$0.0018), and "monthly recommended minimum amount of money for food per person (assuming 31 days per month) is CFA 131,228.86 (around US$237.76, based on the same exchange rate). Recall that the amount of cash reported to have been received by households is between US$201-240. This means that the amount would only help sustain consumption for one person for about a month.

However, this amount is unlikely to be representative for the consumption of poorer households. If we use the international poverty line of US$1.9 (PPP 2011) per day for poor households, the cost of living under the same assumption of 31 days per month would be US$58.9 per person per month. Based on the ANSD and the World Bank Report[93], the poverty line in Dakar is CFA 1,041 per day or US$2.87 per day in 2005 PPP. In other urban areas, it is CFA 809 per day or US$2.29 per day in 2005 PPP. In rural area, it is CFA 606 per day or US$1.72 per day in 2005 PPP, equivalent to around CFA 18,000 per person per month.. The monthly per capita value of the Start transfer varies with household size, but ranges from around 2,000 to around 7,700 CFA per person (from Table 5, with transfers expected to cover 3 months). This is well below the expected value of consumption at the rural poverty line.

The Start Network also carried out market surveys between April and August 2020 in the regions where ARC Replica intervention took place, to record the changes in prices of staple food and agricultural items at markets in the communities where support was provided. It also recorded the availability or these items (abundant, scarce, unavailable, etc.) Discussions about the status of the markets and food prices were included in Annex C of the Start Network payout evaluation report. The analysis included data from the market surveys and the monthly sentinel site checks within the 22 communities. The findings focused on whether or not the prices of staple food items increased or not after COVID-19 restrictions were put in place by the GoS in March 2020 and throughout the period of the ARC Replica intervention (until August 2020). The analysis also included additional

[90] World Food Programme and Nutrition International. (2019) Rice Fortification in Senegal: Landscape Analysis, available at https://docs.wfp.org/api/documents/WFP-0000109018/download/?_ga=2.68436369.1640643477.1616412771-1103848635.1615927948.
[91] https://www.ifpri.org/blog/what-can-we-learn-rising-rice-production-senegal
[92] https://www.numbeo.com/food-prices/country_result.jsp?country=Senegal
[93] Agence Nationale de la Statistique et de la Démographie (A.N.S.D) and the World Bank (2016). Mapping the Poor in Senegal: Technical Report.

secondary data from the World Food Programme (the quarterly Market Monitor report and April 2020 rapid needs assessment in Senegal[94] - and market system reports shared by the GoS Food Security Commission (CSA) that provided insight into national-level market conditions over the same period. The key findings were that the prices of staple food items were somewhat elevated during early 2020 (January to March) due to smaller harvests due to the same poor rainy season that resulted in the ARC Replica pay-out. However, prices were further elevated in April 2020 as a result of restrictions put in place to limit the spread of COVID-19. In June-July 2020, they did not increase substantially but they did not return to normal levels (pre-COVID-19). While specific price spikes and availability challenges were identified by implementing agencies' market surveys during the ARC Replica distribution period, these appear to be related to expected, seasonal trends rather than localised market distortion as a result of ARC Replica programming.

The difficulty in accessing secondary consumption and price data has prevented us from doing more thorough analysis of the impact of the ARC and ARC Replica distributions on household consumption pattern. This points to the need for publicly available secondary household data that are validated and reliable in order to carry out a proper assessment ARC interventions in the future. While it is interesting to look at changes in prices, the analysis included in the Start Network report does not provide price data per food item, which would have been useful for us to calculate the extent to which (how many months) the cash transfer could help sustain the household's food consumption. The difficulty in accessing secondary consumption and price data has prevented us from doing more thorough analysis of the impact of the ARC and ARC Replica distributions on household consumption pattern. This points to the need for publicly available secondary household data that are validated and reliable in order to carry out a proper assessment ARC interventions in the future.

[94] World Food Programme and Commissariat a la Securite Alimentaire (CSA), Evaluation Rapide des Marches, April 2020.