# RESULTS ON ECOSYSTEMS

## 2016-2020

## SHARED RESOURCES, JOINT SOLUTIONS

A just world that values and conserves nature.

2021

Ministry of Foreign Affairs

IUCN National Committee of The Netherlands

WWF

# COLOPHON

This document presents the Impact analysis of the 'Shared Resources, Joint Solutions' (SRJS) programme.

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**Authors:**

- Maxime Eiselin (IUCN NL) and Sander van Andel (IUCN NL)
- Marlen Arkesteijn (WWF NL)

**For more information contact:**

- Maxime Eiselin (IUCN NL). Email: maxime.eiselin@iucn.nl

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# SUMMARY

This report shows how the Shared Resources, Joint Solutions (SRJS) program contributed to securing ecosystems-based international public goods (IPGs) climate resilience, water provisioning, food security and biodiversity. The analysis was based on a selection of outcomes compiled through outcome harvesting. This analysis has found evidence of results at the landscape and local community level that natural ecosystems were restored and better protected when governments and companies adjust their policies and practices. The report illustrates that SRJS contributed mostly to results on ecosystem-based climate resilience. More local research would be useful to fully establish the causality between program outcomes and the impact produced on ecosystems and their services.

# SRJS AT A GLANCE

| Scope of program | |
|---|---|
| Number of ecoregions, countries and landscapes | 9 ecoregions, 16 countries, 26 landscapes (http://arcg.is/1imi5W) |
| Surface area of landscapes | 700.000 $km^2$ (about 16 times The Netherlands) |
| Tree cover area and estimated biomass carbon stock in landscapes | 43 million hectares, covering 53% of the landscape area, sequestering 6.7 Giga ton $CO_2$ in 2016 |
| Number of large rivers in landscapes | 19 (part of 9 transboundary river basins), with a total average discharge of > 152.000 $m^3$/s per year (about 7 times the Rhine River) |
| Estimate number of residents in landscapes | 19,4 million residents in 2015 |
| Number of protected areas and surface area in landscapes | 204 protected areas (25 National Parks) |
| Number of threatened IUCN Red List species in the landscapes | 383 species (34 CR; 103 EN; 246 VU) in 2016 |
| Area of farmland in landscapes | 8.5 million hectares farmland in 2015, of which 3.3 million ha are agroforestry systems |
| Number of partnerships in landscapes | Partnering with 212 Southern CSOs |
| Numbers of laws, policies and norms, implemented for sustainable and inclusive development (DD1). | SRJS partners contributed to changed practices through the implementation of 275 laws, policies or norms of targeted governments (in 45% of the cases), private sector (10%) and community actors (42%). |
| Numbers of laws, policies and norms/attitudes, blocked, adopted, improved for sustainable and inclusive development (DD2) | SRJS partners contributed to 575 blocked, adopted or improved laws, policies and norms/attitudes between 2017 and 2020. |

# 1. INTRODUCTION

### 1.1 Background

Shared Resources Joint Solutions (SRJS) is one of the 25 strategic partnerships supported under the policy framework 'Dialogue and Dissent' of the Netherlands Ministry of Foreign Affairs. In this partnership, IUCN NL and WWF NL worked together to strengthen the capacity of 191 local NGOs and civil society organizations in 16 low- and middle-income countries to join forces with the public and private sector to secure ecosystem-based climate resilience, water, food security and biodiversity. This report consolidates the results on these international public goods (IPGs) after five years (2016-2020) of work.

### 1.2 Rationale and motivation

The main objective of this report is to demonstrate how SRJS contributed to its long-term goal: safeguarding the ecosystem-based IPGs water provisioning, food security, climate resilience and biodiversity. The motivation behind this objective is threefold:

1. **Learning**: For reporting results to the Ministry of Foreign Affairs, the so-called 'accountability ceiling' of the program was put at the level of the outcomes in policies and practices, as not all conditions required to deliver the impacts were in the sphere of control of this program. This resulted in a monitoring protocol that focused on assessing outcomes i.e. changes in practices and policies of governments and businesses. There was limited budget and capacity for monitoring and assessing how the outcomes contributed to the program's long-term impact. Nevertheless, the program made an assumption how outcomes may lead to impact (box 1), so there was an interest to test this assumption on correctness and relevance. The methodology in this report was designed to test this program assumption.
2. **Adaptive management**: We also want to learn what interventions work especially well in terms of contribution to impact so that similar interventions can be applied in other landscape programs. When interventions do not seem effective or lead to changes in ecosystems that threaten the delivery of the IPGs, then strategies of similar landscape programs may need to be adjusted.
3. **Communicating our work**: IUCN NL and WWF NL need to communicate the program's contribution to inclusive and green sustainable development to our key stakeholders and the general public. This creates more awareness for the need to secure ecosystem-based IPGs, for example, by showing the facts and figures of ecosystem degradation and effective responses to curb the degradation.

Box 1: the main assumption in the Theory of Change in relation to the long-term goal.

> The Theory of Change of the program is based on a number of assumptions that explain how the intermediate outcomes lead to the outcomes and finally to the long-term goal. The long-term goal of the program is: 'In selected landscapes the ecosystem-based IPGs water provisioning, food security, and climate resilience are secured for the future through multi-stakeholder governance systems'. The most critical assumption that links the outcomes to the long-term goal is 'Natural ecosystems will be restored and better protected when governments and companies adjust their policies and practices'.

# 2. METHODOLOGY

### 2.1 Indirect impact monitoring with outcomes

This impact analysis was based on outcomes that were collected through outcome harvesting since the start of the program. Firstly, the outcomes were verified by the monitoring & evaluation experts and country experts of the program. Secondly, interviews with program staff were conducted to ensure all relevant-impact data was included. No direct field measurements on state changes of ecosystems and ecosystem services were included in this methodology, but a context analysis was made of the state and trends in natural vegetation in the landscapes where SRJS was active (Annex 1). Box 2 shows the definitions that were used for the terms 'outcome', 'outcome harvesting', and 'impact'.

Box 2: definitions.

Outcome: an observable and significant change in a social actor (individual, group, community, organization, institution) that has been achieved and that has been influenced by the change agent through inspiring, encouraging, facilitating, supporting, pressuring, etc. The focus lies on observable change in behavior, relationships, actions, activities, policies, and practices.

Outcome harvesting: a monitoring and evaluation method in which programme staff and /or evaluators identify, formulate, verify and analyse and interpret 'outcomes'. The method is particularly useful in programming contexts where relations of cause and effect are not fully understood, such as with lobby and advocacy.

Impact: a real and verifiable ecological state change in the landscape that can be attributed to an outcome of a project.

### 2.2 Outcome selection

In order to analyze the contribution of the program to safeguarded ecosystem-based IPGs, a standardized, replicable and verifiable workflow was made. The analysis starts with selecting the outcomes that are closest to achieving an effect on ecosystems, i.e. the DD[1]1 (# of laws, policies and norms, implemented for sustainable and inclusive development) and DD2 (# of laws, policies and norms/attitudes, blocked, adopted, improved for sustainable and inclusive development) outcomes. DD3 (# of times that CSOs succeed in creating space for CSO demands and positions through agenda setting, influencing the debate and/or creating space to engage) outcomes were excluded because its biophysical effects on landscapes is too indirect and unpredictable.

The second step was to select the impact-relevant outcomes from the sub-set of step 1. These impact-relevant outcomes are defined as outcomes that result in a tangible, biophysical state change in the landscape. A distinction was made based on the outcome description, significance and contribution, between realized changes in policies and/or practices (within the program duration) or expected changes (changes expected to occur post-program). For the analysis only realized impact-relevant outcomes were selected. For example, if a government proclaims a new protected area without any follow up in terms of implementation and/or enforcement, it was not counted as realized, but as expected, since no tangible, biophysical state change has yet occurred. Impact-relevant outcomes can represent i.a. a direct action in the field, adoption of ecofriendly practices, the implementation of a project, or blocked practices or policies that directly degrade ecosystems.

[1] The Ministry uses six quantitative indicators to monitor and report on Dialogue & Dissent (D&D). More information on https://helpdesk-opendata-minbuza.nl/dd-indicators/.

Distinctions were also made between direct and indirect impact. A direct impact is defined as an impact that can be linearly attributed to an outcome of a project, and its reported coverage is real and verifiable. An indirect impact is defined as impact for which, often essential, steps have been made by a project but with certain assumptions outside a project's span of control to become fully verifiable. A direct impact usually concerns a smaller but confined scale than an indirect impact.
The analysis avoided double counting of areas and beneficiaries of the quantitative results by taking into account the chronological sequences of outcomes. Only the largest result of an end-outcome was included in the calculation.

### 2.3 Indicators

After selecting these impact-relevant outcomes, an analysis was made of its effects on ecosystem-based IPGs climate resilience, water provisioning, and food security. Indicators of the results framework of Inclusieve Groene Groei (Inclusive Green Growth/ IGG) of the Dutch Ministry of Foreign Affairs were used together with their methodological notes.

Next to these indicators, also state and trend information was analyzed to show contextual information of the ecosystems of the landscapes, such as the surface area of the landscapes, forest cover area, agricultural land area, number of river basins and large rivers, average river discharge, number of protected areas, number of threatened species, and population numbers. Annex 1 shows the methodology for this context analysis.

### 2.4 Harvesting the numbers

Every impact-relevant outcome was screened on performance in relation to the selected indicators. Often, a certain location, area, species or beneficiaries was mentioned in the outcome title, description, significance or contribution that can be used for filling in the magnitude of the relevant IPG indicator(s). The majority of outcomes were relevant to more than one IPG. This supports the notion that climate change, water provision, food security and biodiversity are strongly interlinked and should be considered in context.

If information in the outcome was limited or vague, then more sophisticated methods were used to determine the performance of the indicator, for instance, satellite image interpretation with the Sentinel 2 satellite or Google Earth Pro to determine forest(ed) land area, GIS analysis with the Hydrosheds database on river basins to determine area under IWRM, GIS analysis with worldwide population density of Worldpop data to determine the number of benefitting in the area from secured ecosystem services, threatened species based on the advanced search feature of the IUCN Red List, and Google searches on news, scientific journals and freely available dataset to get more pieces of information about the numbers behind the outcome.

### 2.5 Contribution

In the results framework of the IGG, a last step in the methodology was also to include a contribution rating for indicating what the contribution of the SRJS program was to the impact. In the reporting to the Ministry, only results with a high contribution were reported. In a high contribution result, the program provided a fundamental lobby support.

In this analysis however, we refrain from a contribution analysis since in our view, minimal interventions can have huge impacts, while huge interventions may result in minimal impacts. More nuance in the necessity and sufficiency of an intervention is needed to understand the complexity of a contribution, which was not available in the dataset.

# 3. RESULTS

Between the years 2016 and 2020, a total of 1126 outcomes were reported, of which 851 fall within the category DD1 or DD2. 198 outcomes were selected as impact-relevant for the indicators of ecosystem-based climate resilience, water provision, food security, livelihoods and biodiversity. Of these 198 outcomes, 129 have realized impact (122 directly; 7 indirectly). Furthermore, impact is expected to be achieved in the near future as a result of 69 other outcomes (55 directly; 14 indirectly). In this chapter, the results on realized impact are shown per IPG.

The vast majority of selected outcomes that directly realised impact has been established through partnerships between CSOs, communities and government actors (117 out of the 122 outcomes), while only 5 have been established through partnerships with the private sector. Working with the private sector through dialoguing strategies is in its infant stages for most of the CSOs (see also the Final SRJS evaluation). Within the outcomes however, many examples can be found of stopping illegal or unwanted actions of the private sector: communities and CSOs demanding the government to enforce policies (dissent strategies).

### 3.1 Climate resilience

The program aims to bring forest(ed) land under sustainable forest management or other improved practices. This contributes to decreased deforestation, enhanced carbon sinks and increased adaptive capacity of ecosystems and livelihoods, and thus to climate resilience.

**Context**

The total tree cover area of the landscapes is estimated to be about 43 million hectares in 2016. On average, 53% of the land cover in the landscapes is tree cover. This tree cover can theoretically cover about 10 times the surface area of the Netherlands. The above ground tree-biomass stores about 6.7 Gigatons of $CO_2$-eq emissions, which equals roughly 41x the amount of yearly emissions of the Netherlands (in 2017).

The average tree cover loss in the landscapes is about 300.000 ha per year between 2000 and 2015. The tree cover loss rate decreased by about 50.000 ha per year in the years 2016, 2017 and 2018 compared to this 2000-2015 rate. So over the first few years of the program, the tree cover loss rate was reduced. This avoided about 4.4 million kiloton $CO_2$-eq emissions from forest-biomass carbon stock loss. Keeping carbon sequestered in forest biomass contributes to climate change mitigation and the efforts of the Dutch government to achieve the Paris climate goals.

Tree cover loss data of 2019 and 2020 are not available at the time of writing this report. We do know that after 2018, violent forest fires blazed away a substantial volume of forest (Indonesia, Bolivia and Paraguay), which probably reversed trend towards higher rates of tree cover loss again. More research would be needed to determine the contribution of the program to reduce forest loss. However, it is likely that rates of deforestation would have been larger than they had been due to the implementation of various laws, agreements and court cases that halted or reduced deforestation. In addition, capacity strengthening for improved forest fire management was increased.

**Results**

The program contributed directly to managing about 2.7 million hectares of forests more sustainably with 77 outcomes across 19 landscapes. As such, more than 15% of the total forest cover is now under improved management in the landscapes Southern Palawan, Mekong Flooded Forest, Chaco Pantanal; between 15% and 5% in Murchison Falls, Aceh, Ouémé Delta, and below 5% in the rest of landscapes. Program-wide realized results on climate resilience are shown in table 1a, 1b and 1c:

*Table 1a: results on climate*

| | | | |
|---|---|---|---|
| Area of forest(ed) land under sustainable forest management or other improved practices contributing to decreased deforestation, enhanced sinks and increased adaptive capacity of ecosystems and livelihoods. | *Type of forest management* | *Direct (hectares)* | *Indirect (hectares)* |
| | Agroforestry | 0 | 0 |
| | Forest protection | 1.748.000 | 47.000 |
| | Reforestation | 71.000 | 0 |
| | Sustainable forest management | 851.000 | 0 |
| | *TOTAL* | 2.669.000 | 47.000 |
| Examples | - Bolivian Indigenous Autonomous Government declares second largest conservation area in the Gran Chaco<br>- Livestock company in Paraguay held liable for illegal deforestation | | |

*Table 1b: results on climate*

| | | | |
|---|---|---|---|
| Adoption and implementation of inclusive forest (smart) public and private policies, plans, commitments and practices in the landscape. | *Year* | *Direct influence (policies, plans, commitments and practices)* | *Indirect influence (policies, plans, commitments and practices)* |
| | 2016 | 0 | 0 |
| | 2017 | 13 | 1 |
| | 2018 | 23 | 1 |
| | 2019 | 26 | 0 |
| | 2020 | 15 | 0 |
| | *TOTAL* | 77 | 2 |
| Examples | - Local government unit terminates deal with mining firm in the Philippines<br>- Increased protection for elephants and other wildlife through corridors, in Aceh Indonesia | | |

*Table 1c: results on climate*

| | | | |
|---|---|---|---|
| Number of beneficiaries supported by projects and programs on sustainable agriculture and/or forestry practices in the landscape / jurisdiction. | *Year* | *Direct beneficiaries* | *Indirect beneficiaries* |
| | 2016 | 0 | 0 |
| | 2017 | 38.000 | 0 |
| | 2018 | 166.000 | 163.000 |
| | 2019 | 3.000 | 0 |
| | 2020 | 5.000 | 0 |
| | *TOTAL* | 212.000 | 163.000 |
| Examples | - Forest cover restoration improves the income of women in Ghana | | |

Mekong Forest © Kouy Socheat NTFP EP Cambodia

### 3.2. Water provisioning

**Context**

The program aimed to secure ecosystem-based water provisioning through integrated water resources management (IWRM). The geographical focus encompasses water resources in 14 river basins of which 9 are transboundary river basins. The surface area covered by landscapes in the program represent about 7% of these transboundary river basin areas. There are flowing 160 medium-size rivers and 19 large rivers across the landscapes. Based on Strahler stream order analysis of Hughes et al. (2010)[2], it is estimated that the 19 large rivers have an average annual discharge of at least 152.000 $m^3/s$. By comparison, the Amazon River has an average annual discharge of 209.000 $m^3/s$, the Congo River 41.200 $m^3/s$, and the Rhine River 2.200 $m^3/s$.

**Results**

In terms of impacts at landscape level, there is a great variability across landscapes contributing to water provisioning. The Mono River Basin (100.000 ha) and Ouémé Delta (85.000 ha) in Benin, Mekong Flooded Forest (85.000 ha) in Cambodia, Nakambé basin in Burkina Faso (37.000 ha), and Kafue Flats in Zambia (34.000 ha) are landscapes with clear results on integrated water resources management. These landscapes were responsible for achieving the bulk of the 38 outcomes on IWRM. The outcomes are mostly related to landscape-wide land use planning, in which upstream free flowing rivers are preserved to benefit downstream ecosystems and water users. For instance, in all of the above landscapes dam construction was a threat that was (at least temporarily) abated by the program. Table 2a and 2b show the types of land uses that have been brought under IWRM.

*Table 2a: results on water security*

| | | |
|---|---|---|
| Area of basins with an operational plan for integrated water resources management | *Land use type* | *Hectares* |
| | Forest land | 262.000 |
| | Agricultural land | 22.000 |
| | Other land types[3] | 225.000 |
| | *TOTAL* | 510.000 |
| Examples | - Zambia halts hydropower dam on Luangwa river<br>- Towards a more responsible mining sector in Burkina Faso | |

*Table 2b: results on water security*

| | | | |
|---|---|---|---|
| Number of people benefiting from improved river basin management and safe deltas | *Year* | *Direct beneficiaries* | *Indirect beneficiaries* |
| | 2016 | 0 | 0 |
| | 2017 | 23.000 | 0 |
| | 2018 | 162.000 | 162.000 |
| | 2019 | 2.000 | 0 |
| | 2020 | 31.000 | 0 |
| | *TOTAL* | 218.000 | 162.000 |
| Examples | - Assessing environmental flows to secure ecosystem services in Benin<br>- Protection of water sources for Indigenous communities in Bolivia<br>- Aligning interests for a stable water supply in Tanzania | | |

[2] Hughes et al. (2010) National and Regional Comparisons. Between Strahler Order and Stream Size. Journal of the North American Benthological Society 30(1):103-121 · December 2010.

[3] Land cover types such as water bodies, urban areas, bare land, and shrubland.

### 3.3. Food security

**Context**

Over the last decades, the area of monoculture cropland increased at a faster pace than land with agroforestry in the landscapes. To counteract this negative trend, partners implemented activities with a focus on practices and policies for sustainable food production systems, for instance supporting eco-friendly use of inputs, improved fishing practices and agro-ecological land management.

**Results**

Since the start of the program, 52 outcomes resulted in improved practices and policies for sustainable food production systems. The largest agricultural areas with improved sustainable food production are located in the Chaco Pantanal in Paraguay and Bolivia (31.000 ha), Kafue Flats, Zambia (22.000 ha), Tanintharyi, Myanmar (15.000 ha), Mekong Flooded Forest, Cambodia (15.000 ha), Soalala, Madagascar (6.000 ha) and Ouéme delta, Benin (5.000 ha). Program-wide results on food security are shown in table 3a and 3b.

Benin Ouémé Delta © Jan Kamstra

Table 3a: results on food security

| | | | |
|---|---|---|---|
| Number of hectares of farmland converted to sustainable use | *Year* | *Direct* | *Indirect* |
| | 2016 | 0 | 0 |
| | 2017 | 30.000 | 0 |
| | 2018 | 1.000 | 0 |
| | 2019 | 27.000 | 350.000 |
| | 2020 | 40.000 | 0 |
| | *TOTAL* | 97.000 | 350.000 |
| Example | - Involving communities to adopt sustainable fishing methods<br>- Protecting mountain forests creates win-win situation | | |

Table 3b: results on food security

| | | | |
|---|---|---|---|
| Number of people benefiting from farmland that is converted to sustainable use | *Year* | *Direct* | *Indirect* |
| | 2016 | 0 | 0 |
| | 2017 | 10.000 | 0 |
| | 2018 | 3.000 | 163.000 |
| | 2019 | 11.000 | 0 |
| | 2020 | 5.000 | 0 |
| | *TOTAL* | 29.000 | 163.000 |

Agriculture Philippines © Erwin Mascarinas, NTFP-EP Philippines/ IUCN NL

### 3.4. Biodiversity

**Context**

The landscapes include a total of 204 protected areas (covering almost 6 million $km^2$), of which 22 are national parks, 71 key biodiversity areas (KBAs) and 60 important bird areas (IBAs). There are also numerous community-based conservation areas, like Indigenous and community conserved areas (ICCAs) (e.g. in Zamboanga and Palawan in Philippines, Tanintharyi in Myanmar and Mono River Basin in Benin) and community resource management areas (CREMAs) in Mole and Weto in Ghana and the Mekong Flooded Forest in Cambodia.

It is estimated that SRJS landscapes are home to 5923 species (amphibians, birds, mammals, reptiles) of which 383 are threatened Red List species (34 CR; 103 EN; 246 VU). The landscapes with the highest species diversity are Tanintharyi (Myanmar, 1190 species), Queen Elisabeth (Uganda, 1023 species), District 9 (Guyana, 981 species). The highest level of critically endangered species was found in Cambodia (14 species). Table 4 shows the number of species per taxonomic class and IUCN Red List status in the SRJS landscapes, showing that 34 amphibia, 165 bird, 135 mammal, 49 reptile species, are threatened.

Table 4: Number of species in SRJS landscapes according to taxonomic class and IUCN Red List Status

| Row Labels | Least Concern | Near Threatened | Vulnerable | Endangered | Critically Endangered | Data deficient | Grand Total |
|---|---|---|---|---|---|---|---|
| AMPHIBIA | 451 | 32 | 24 | 9 | 1 | 20 | 537 |
| AVES | 3153 | 233 | 105 | 41 | 19 | 9 | 3560 |
| MAMMALIA | 974 | 73 | 88 | 41 | 6 | 95 | 1277 |
| REPTILIA | 434 | 21 | 29 | 12 | 8 | 45 | 549 |
| **Grand Total** | **5012** | **359** | **246** | **103** | **34** | **169** | **5923** |

Before the start of the program, all selected landscapes showed a downward trend of the coverage of natural ecosystems in the landscapes. Land use maps of ESA shows that between 1995 and 2015 an average of about 2% of natural ecosystems vegetation was lost. The loss of habitat is one of the largest drivers for species extinction.

**Results**

Harvested outcomes showed that the SRJS landscape programs mostly adopt an ecosystem or landscape focus and do not have a specific species conservation focus. However, we assume that by achieving outcomes that result in conserved, connected or restored habitats that are critical to specific species, there will a contribution to the conservation of species directly and indirectly. More research would be needed to confirm this contribution, which was beyond the scope of this analysis.

Elephants in Uganda Queen Elizabeth Park © Laurent de Walick

### 3.5. Results on beneficiaries from secured ecosystem services

**Context**

The estimated number of people that live in the 26 landscapes is 19.4 million in 2016. The location of the landscapes are plotted on a map on http://arcg.is/1imi5W. The surface area of the 16 landscapes is 662.000 km$^2$, representing almost 16 times the surface areas of the Netherlands. The largest landscapes represent Chaco Pantanal in Bolivia and Paraguay (13.512.000 ha), 2: Rukwa-Katavi in Tanzania (7.774.000 ha), 3: South Suriname Conservation Corridor (6.197.000 ha). The most populated landscapes are the landscapes Ouème Delta in Benin, Cordillera in Philippines, Kafue Flats in Zambia and Aceh in Indonesia, which all have more than 2 million residents in 2015.

**Results**

The integrated landscape approach often means that residents can benefit from multiple IPGs. The program contributed to improved access to ecosystem-based water resources, food and climate resilience. By aggregating the number of beneficiaries from these IPGs in each landscape, we estimated that the number of people benefitting directly from the program is about 443.000.

# 4. CONCLUSION AND DISCUSSION

### 4.1 Conclusion

This report present an analysis for the estimated quantitative contribution of the SRJS program to the ecosystem-based IPGs climate resilience, water provisioning, food security and biodiversity. Albeit securing ecosystem-based IPGs is a long-term goal that is beyond the accountability ceiling of the program, this analysis found evidence of impacts at landscape and local community level that contribute to this goal. More specifically, the evidence of impacts on ecosystem-based IPGs has derived from specific, traceable program interventions that relate to changes in policies and practices.

The program contributed to the sustainable management of forestlands, water catchment areas and food production areas. When using the methodology in this report, it can be concluded that the program was most successful on the ecosystem-based IPG climate resilience. The direct result of improving the sustainability management of 2.7 million hectares of forest areas (with 212.000 direct beneficiaries) is significantly larger than the 510.000 hectares of catchment areas (with 218.000 direct beneficiaries) and 97.000 hectares of food production areas (with 29.000 direct beneficiaries). Most outcomes contributed to impact on climate resilience (77x), followed by water provisioning (38x) and food security (52x). It is also likely that the ecosystem-based approach of the program has contributed directly and/or indirectly to decreasing the extinction risks of species, although this remains an assumption.

With the results we can test the main assumption in the Theory of Change in relation to the long-term goal: 'Natural ecosystems will be restored and better protected when governments and companies adjust their policies and practices'. We observed that natural ecosystems are not necessarily being restored and better protected when governments and companies adjust their policies. From the 851 DD1 and DD2 outcomes, only 198 outcomes had a high likelihood to contribute directly or indirectly to a realized or expected impact. The key factor for change is the degree of implementation and compliance.

### 4.2 Discussion on methodology & impact

In an ideal monitoring and evaluation process, field baseline measurements are taken at the program inception to show impact at the endline of a program. However, due to the focus on lobby and advocacy, the starting point of this assessment was set at the harvested outcomes provided by the implementing CSO partners of IUCN NL and WWF NL. The outcomes were supplemented with external sources (scientific journals, news article, grey literature, remote sensing data, GIS analysis) and expert validation with local CSOs and country experts to challenge the findings and identify potentially 'missed information'. The strength of this method is that it is low-cost, as it builds upon the outcome harvesting information that was gathered. The weakness of this method is that it does not measure the true impacts in the field, so the magnitude of impact remains an approximation.

It is expected that in the coming years new outcomes will emerge from the lobby and advocacy trajectories that have been setup, which will gain additional results in the field. These upcoming results fall beyond the scope of this analysis. Taking into account all these caveats, this impact analysis is not claiming all the identified impacts, but rather, it does show that working at the landscape level has great potential and can contribute to positive results on securing ecosystem-based IPGs.

### 4.3 Lessons & recommendations

We can draw the following lessons and recommendations from this analysis.

**1. Inclusive landscape governance is needed to achieve scale**

The landscape approach can be a powerful enabler for managing large areas more sustainably. In our analysis we observed that implemented policy changes at the landscape level result in higher magnitudes of impact than implemented practice changes on scattered plots of lands. One of the examples is Chaco Pantanal in Bolivia and Paraguay, where enormous areas of conservation areas were added between existing conservation areas to improve habitat connectivity. It is therefore worthwhile to consider focusing more on implementing the right policy conditions that can leverage coordinated landscape level change than influencing single actors to change their practices.

**2. Impact is fluid in time and space**

Although we strive for achieving long-lasting results, impact remains multi-facetted and can change over time. For instance, if in year 1 of the program tropical deforestation is halted because agricultural land is no longer expanding, then this does not necessarily mean that the forests still stand a few years later in the program. After reporting an impactful outcome, wildfires or other threats to the forest can still cause deforestation later. For example, in municipalities in the Chaco Pantanal, 2.250.430 ha of forests were affected by forest fires in 2019. We also found evidence of the intertwined nature of impacts on IPGs, where there is a positive spillover effect, which can be considered as one of the benefits of the landscape approach. For instance, wetland restoration has positive impacts for climate resilience, water- and food security.

**3. Evaluate the sustainability of the program with an ex-post impact analysis**

The program length was too short to be able to draw definite long-term impacts on ecosystem-based IPGs. Many key informants from partner CSOs also emphasised the need for longer time cycles (ten to fifteen years) to be able to establish clear causality between outcomes and ecosystem-based IPG-level impacts. Now the program has ended, the enabling environment has been optimized in many landscapes to change the needed policies and practices, making it plausible that more impact will be reached after the program. To capture the sustainability of the results that are achieved within the program duration and also the newly achieved results after the program, we recommend evaluating the program with an ex-post impact analysis in about five to ten years in these types of programs.

**4. A small contribution can make big impacts**

SRJS proved to achieve results through initiating ideas, and mobilising and facilitating stakeholder groups to do something new or different. The contribution of a local partners in achieving a change can therefore be low, but the impact high. In the design of the monitoring frameworks of future programs, we recommend to have a clear definition of contribution, by including metrics about the necessity of interventions (was the intervention necessary for the impact) and sufficiency (was the intervention sufficient to result into impact).

**5. Indirect impact monitoring increases error margin of results**

The method used in this analysis is pragmatic and low cost. This method is by no means a scientific approach for measuring impacts, as it makes use of stories and narratives and not of field measurements. The results should therefore be interpreted as an estimated magnitude for the achieved impact. There will always be an error margin because story-based results are not as accurate as field measurement.

In order to make a more robust impact measuring methodology, we recommend to build in a simple numerical reporting requirement for local partners to supplement the outcome harvesting reporting. Ideally, the results reporting of the partners on the indicators is being done spatially, by drawing the relevant areas on an online map. Information about direct/indirect, potential/realized impact should also be reported. Applying the subsidiarity principle makes the information more robust as it is closer to the information source, for instance with community-based monitoring. In an ideal monitoring process, direct impact is verified by comparing the harvested results from the partners with actual (independent) impact monitoring in the field.

**6. Monitoring impact is a must**

Within the loads of reports written for SRJS, but also at policy level of the MoFA, there is a tendency to focus on strengthening capacities of local organisations and strengthening citizens' voices, without emphasising its link with the long-term goal. The pathway towards reaching the long-term goal should always be made very clear, so all stakeholders work towards the same impact. Impact monitoring is a must needed component in monitoring to evaluate and learn if we are doing the right things and the things right.

# ANNEX 1: SPATIAL ANALYSIS METHOD FOR THE CONTEXT DESCRIPTIONS

This annex shows the spatial analysis methods that where applied to describe the state and trends of the IPGs climate resilience, food- and water security, and biodiversity. It explains how we calculated the area of tree cover, agricultural lands, natural vegetation; number of rivers and river basins; number of residents; and number of threatened species.

**Tree cover**
The time series (2000-2018) of tree cover was based on research from Hansen et al. (2013)[4]. The data was extracted by uploading a polygon of the landscape area at Global Forest Watch. Carbon stocks were estimated based on UNFCCC REDD literature from Bibbs et al. (2007)[5]. The stocks were based on estimated carbon stock averages of broad forest categories per unit area that have been correlated with the respective biome per landscape.

<u>Assumptions</u>

1. Hansen et al. defined 'tree cover' as all vegetation greater than 5 meters in height, and may take the form of natural forests or plantations across a range of canopy densities. 'Loss' indicates the removal or mortality of tree cover and can be due to a variety of factors, including mechanical harvesting, fire, disease, or storm damage.
2. Tree cover gain could not be taken into account in this assessment, because there are too little data points available in the dataset of Hansen et al. (only in the years 2001 and 2012). The tree cover loss is therefore the 'gross' loss and not the 'net' loss.
3. The authors are 75 percent confident that the loss occurred within the stated year, and 97 percent confident that it occurred within a year before or after. In this assessment, potential errors are smoothened out by examining tree cover loss averages over multiple years with time steps of 5 years.

**Agricultural lands**
To define trends in the extent of (sustainably use of) agricultural lands, the land cover mapping time-series from ESA Climate Change Initiative (2017)[6] was used for the years 1995, 2000, 2005, 2010, 2015. The spatial resolution of the raster files is 300 x 300 meter. The values and labels of the land cover dataset that was masked by the landscapes to calculate the area of agricultural areas is shown in table 2.3. Land cover data of farmland the years after 2015 is not available. The tables 5 & 6 and figure 1 show the results of a satellite time-series analysis of agricultural land use trends and types.

Table 5: land cover types that are relevant for agricultural lands

| Value of raster attribute layer | Label |
|---|---|
| 10 | Cropland, rain fed |

[4] Hansen et al. (2013) High-Resolution Global Maps of 21st-Century Forest Cover Change. Science 342 (15 November): 850–53. Data is available at www.earthenginepartners.appspot.com/science-2013-global-forest

[5] Gibbs et al. (2007) Monitoring and estimating tropical forest carbon stocks: making REDD a reality. Page 5. Website: https://redd.unfccc.int/uploads/2_112_redd_20081022_tfg.pdf

[6] ESA Climate Change Initiative, Land Cover – led by UCLouvain (2017). "1992-2015 global land cover." Data is available at http://maps.elie.ucl.ac.be/CCI/viewer/

| | |
|---|---|
| 20 | Cropland, irrigated or post-flooding |
| 30 | Mosaic cropland (>50%) / natural vegetation (tree, shrub, herbaceous cover) (<50%) |
| 40 | Mosaic natural vegetation (tree, shrub, herbaceous cover) (>50%) / cropland (<50%) |

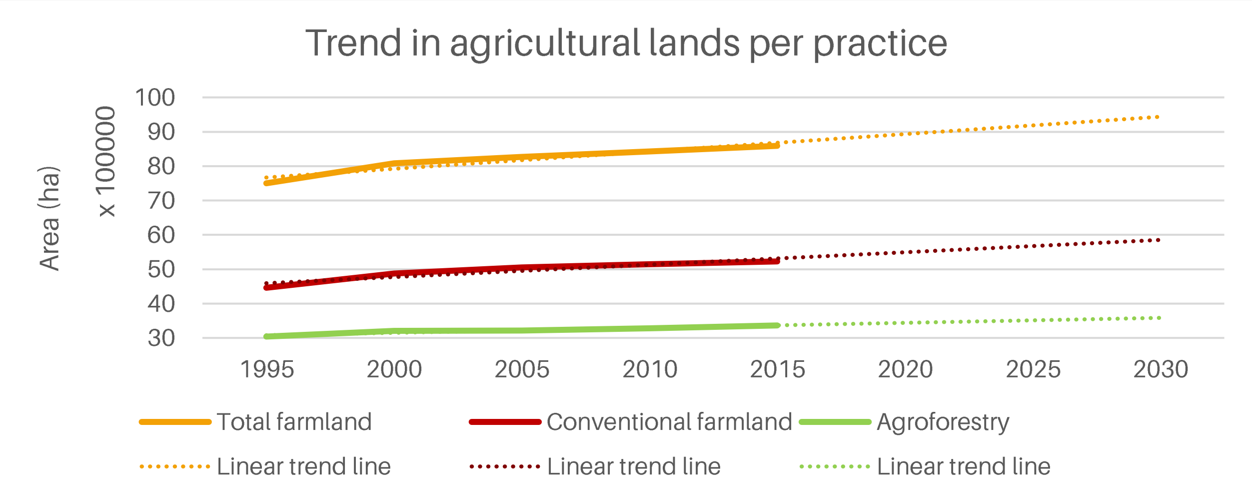


Figure 1: trends in agricultural land uses in the landscapes

Table 6: agricultural land uses in the landscapes

| Agricultural land cover practice | Area in 2015 (ha) | Coverage of landscapes |
|---|---|---|
| Conventional farmland | 5.226.246 | 7,9% |
| Agroforestry land | 3.363.633 | 5,1% |
| Conventional farmland + agroforestry land | 8.589.879 | 13,0% |

Assumptions

1. The overall data-accuracy of the ESA land cover classes are acceptable for this assessment, but can still be affected by errors in regions with small-scale mosaic type of land uses. For instance, changed practices towards more sustainable use of small-scale farmland cannot be recognized at a resolution of 300x300 meter.
2. The use of pesticides, herbicides and soil management practices cannot be taken into account in this satellite analysis.

**Integrated water resources management**

The spatial dataset of Hydrosheds (Lehner et al., 2013)[7] was use to overlay river basins and rivers on the landscape areas. The 3rd level of sub-basin breakdown has been selected to display the main transboundary river basins.

The number of rivers was identified by assigning a numeric order to links in a stream network, as described by the Strahler method of Hughes et al. (2010)[8]. The Strahler method is used in hydrology studies to identify and classify sizes of streams based on their numbers of tributaries. The index of a

[7] Lehner, B., Grill G. (2013): Global river hydrography and network routing: baseline data and new approaches to study the world's large river systems. Hydrological Processes, 27(15): 2171–2186. Data is available at www.hydrosheds.org.

[8] Hughes et al. (2010) National and Regional Comparisons. Between Strahler Order and Stream Size. Journal of the North American Benthological Society 30(1):103-121 · December 2010. Website:

stream or river may range from 1 (a stream with no tributaries) to 12 (globally the most powerful river, the Amazon, at its mouth). The Ohio River is of order 8 and the Mississippi River is of order 10. Estimates are that 80% of the streams on the planet are first to third order headwater streams (Stream order, 2020)[9]. This assessment has identified a medium-size river as a river with a Strahler order between 6 and 8 and a large-size river as a river with a Strahler order of 9 and higher. The GRIN v. 1.0 dataset (Schneider et al., 2017)[10] was used to assess the Strahler order of the river networks in the landscapes.

Assumptions

1. The Strahler method is the most common stream ordering method. However, because this method only increases in order at intersections of the same order, it does not account for all links and can be sensitive to the addition or removal of links.
2. People that benefit from IWRM measures are located in the landscape borders.

**Protected areas**

1. Shapefiles of protected areas per country were downloaded from www.protectedplanet.net in February 2019. The dataset provided information about each protected area (e.g. area name, designation type, IUCN protection category, area in $km^2$, status year, management authority). The protected areas and meta-information that overlap with the program landscapes were extracted with GIS software and exported to excel. The database of Protected Planet is not always up-to-date and accurate, so harvested outcomes provided the latest information about established protected areas, in particular the areas that are protected by community arrangements, such as CREMAs and ICCAs.

Assumptions

The database of Protected Planet cannot provide warranty of any kind is to its completeness or accuracy, but it can be assumed that the data quality of large and long-established protected areas is sufficient for the purpose of our work.

**Natural ecosystems**

To define trends in the extent of natural ecosystems, the land cover mapping time-series from ESA Climate Change Initiative (2017) was used for the years 1995, 2000, 2005, 2010, 2015. The spatial resolution of the raster maps is 300 x 300 meter. The values and labels of the land cover dataset that were masked by the landscapes to calculate the area of natural ecosystems are shown in table 7.
A natural ecosystem is a biological environment that is found in nature (e.g. a forest and other natural vegetation) rather than created or altered by man (e.g. a farm with cropland). Natural ecosystems should be large enough to maintain native biological diversity and functions, such as reducing vulnerability of humans to current and expected impacts of climate change through increased resilience or reduced exposure. The trend of the coverage of natural ecosystems in the landscapes is downwards, see figure 2.

Table 7: land cover types that are relevant for natural ecosystems

| Value | Label |
|---|---|
| 50 | Tree cover, broadleaved, evergreen, closed to open (>15%) |
| 60 | Tree cover, broadleaved, deciduous, closed to open (>15%) |
| 70 | Tree cover, needleleaved, evergreen, closed to open (>15%) |
| 80 | Tree cover, needleleaved, deciduous, closed to open (>15%) |

[9] Stream Order – The Classification of Streams and Rivers. Website: https://www.thoughtco.com/what-is-stream-order-1435354

[10] Strahler orders from GRIN v. 1.0. Website: http://www.fao.org/nr/water/aquastat/maps/index.stm

| | |
|---|---|
| 90 | Tree cover, mixed leaf type (broadleaved and needleleaved) |
| 100 | Mosaic tree and shrub (>50%) / herbaceous cover (<50%) |
| 110 | Mosaic herbaceous cover (>50%) / tree and shrub (<50%) |
| 120 | Shrubland |
| 130 | Grassland |
| 150 | Sparse vegetation (tree, shrub, herbaceous cover) (<15%) |
| 160 | Tree cover, flooded, fresh or brakish water |
| 170 | Tree cover, flooded, saline water |
| 180 | Shrub or herbaceous cover, flooded, fresh/saline/brakish water |

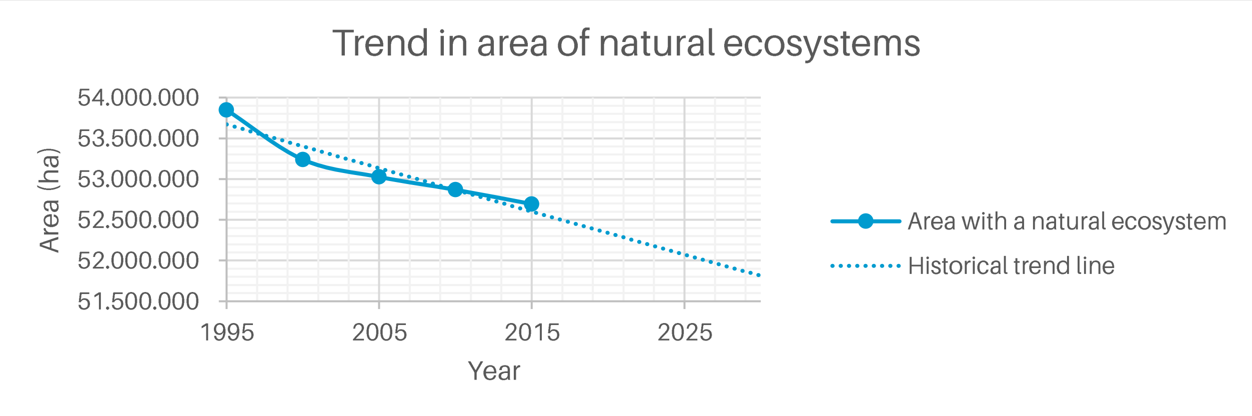


Figure 2: trend in area of natural ecosystems between 1995 and 2015

<u>Assumptions</u>

1. The overall data-accuracy of the ESA land cover classes are acceptable for this assessment, but can still be affected by errors in mosaic land uses.
2. Naturalness of land cover classes is sometimes difficult to define if the background biome of the landscape is characterized by grasslands, woodlands and scrubland, because this can also be degraded or secondary tree cover.
3. Natural marine or freshwater ecosystems were not taken into account in this assessment.

**Threatened Red List species**

The spatial GIS dataset of the IUCN Red List served as input for identifying the species composition and level of species endangeredness in the landscapes. Analysis of saved species by the program was identified using the 'Advanced' search option of https://www.iucnredlist.org/. This search option has a feature to draw a shape of the location (where an outcomes took place) while also ticking labels such as species threat, habitat type, Red List status, conservation actions, etc. that is relevant for an outcome.

<u>Assumption</u>

The spatial dataset of the IUCN Red List is assumed to offer a correct representation of the species composition in the landscapes, but it is clear that there are many data-gaps in terms of up-to-date biodiversity surveys, geographical scoping, spatial resolution, and species groups. In this assessment, the species groups that have been included are amphibians, aves, mammalia and reptilians.

**People benefitting directly from secured ecosystem services**

When no information was available about the number of people benefitting from an outcome but when the location has been known, then the spatial GIS dataset of WorldPoP (https://www.worldpop.org/) served as input for identifying the population density of residents in the landscapes. The database of

WorldPoP is focusing, in particular, on low and middle-income countries where high-quality data has historically been lacking. The data is based on the estimated number of people per pixel of the year 2015, with national totals adjusted to match UN population division estimates, at a gridded scale of 100 x 100 meters.

<u>Assumption</u>
The policies and practices that the program changed, have a local effect on the delivery of ecosystem services for the residents that live there, be it directly or indirectly.