technopolis |group|

February 2018

Impact evaluation of National Research Programmes 59, 60 and 61

Final report

technopolis|group|

Impact evaluation of National Research Programmes 59, 60 and 61
Final report

technopolis |group| February 2018

Peter Kolarz
Erik Arnold
Helmut Fryges
Adam Krcal
Viola Peter
Maike Rentel

Table of Contents

Tables

Figures

Executive summary

This report presents the findings of the impact evaluation of National Research Programmes (NRPs) 59, 60 and 61. The study was commissioned by the Swiss National Science Foundation (SNSF) and was carried out by Technopolis. It fulfils two purposes: first, to provide ex-post judgement and accountability of the impacts of the three NRPs; second, to extract lessons from the resulting comparative perspective to strengthen the NRP instrument in the future.

NRP 59 – Benefits and Risks of the Deliberate Release of Genetically Modified Plants

NRP 59 intended to produce an evidence base to inform decision-making on Swiss GM policy, including the moratorium on GM crops. It funded 29 projects across a broad range of disciplines. Most researchers involved were based at ETHZ and at several cantonal universities. The NRP produced an estimated 184 published academic outputs, many of which constitute excellent science. It received much media attention and had a relatively straightforward knowledge transfer (KT) concept, as it mainly addressed a clearly defined group of stakeholders, who were aware of the programme and expected to make use of its results. NRP 59 operated in a highly politicised context, which was also evident among the individuals involved within the programme itself. Despite the production of excellent science and the presence of clear lines of communication to the practical realm, the majority of researchers, steering committee members and wider stakeholders are of the view that NRP 59 did not achieve its main intended non-scientific impact. The nature of the polarised debate on GM crops meant that the evidence base presented did not have substantive influence on the final decision about the GM moratorium, or on Swiss GM policy more broadly.

NRP 60 – Gender equality

NRP 60 aimed to gather evidence on gender inequality in Switzerland across different sectors of policy and practice and shape these to effect better gender equality outcomes. An impressive amount of outreach and dissemination activity was conducted with many different stakeholders at both programme and project levels. Whilst the programme had some substantial non-academic impacts, these occurred mainly in fields and organisations already tasked with gender equality. Areas of policy and practice not traditionally involved with questions of gender inequality appeared more difficult to reach. Both the available documentation and researchers' own perceptions suggest that the NRP's impact in these areas has been less significant than was hoped. In academic terms, this NRP produced a volume of outputs comparable to NRPs 59 and 61, although the publications are generally more nationally than internationally significant. However, the field of gender studies and gender equality was less developed in Switzerland at the start of the NRP than in many comparator countries, which in itself heightened the need for an evidence base of the type it created. While NRP 60 therefore made an important contribution to building capacity in Switzerland, its international citation metrics were less impressive than the other two NRPs evaluated here.

NRP 61 – Sustainable water management

NRP 61 involved especially close collaboration between researchers and practitioners. Co-creation of research was a critical component of the KT concept and appears to have been successful. The aim was to develop understanding and good practice among practitioners to ensure sustainable water management in the context of challenges posed by climate change, the threat of natural disasters and changing use structures. At the same time, the long-term nature of the NRP's aims and the absence of immediate policy decisions to be supported also mean that the most important dimension of its intended impact cannot fully be judged at this point. Practices and processes were developed and implemented by the practitioners involved in several projects. However, there is little evidence that these have also been adopted by other organisations that did not participate in the NRP, and which were instead targeted by outward-facing dissemination activities such as presentations and instructional videos. Despite its closeness to practice, NRP 61 has also produced high-impact scientific work, although it must be noted that Switzerland (and many of the organisations involved) was a world-leader in this academic

field already. Whilst the administration and organisation of NRPs 59 and 60 has largely been unproblematic, NRP 61 encountered some problems, including unclear communication of the KT concept to the researchers and a limited ability in some projects to operationalise the transdisciplinary, co-creating approach that was intended. These difficulties owe at least in part to the NRP's innovative approach to KT.

The NRP instrument: A healthy and flexible tool

All three NRPs have a similar structure and size and we find no evidence of any concern in this respect, other than the division into 'modules' or 'clusters', which may add unnecessary layers of sectioning and undermine programme coherence. All three NRPs were well organised and highly productive, equalling on average the amount of academic output of mainstream SNSF projects, despite their additional mission to address non-academic problems. Winning an NRP project is considered prestigious and there was high demand by researchers to get involved. All three NRPs had appropriate levels of scientific impact, though this must always be seen in context: NRP 61 could build on a uniquely strong internationally recognised research base, while NRP 60 needed to build capacity in an underdeveloped field. Hence, measurable levels of scientific impact differ significantly between the three NRPs.

This latter point on different scientific 'baselines' illustrates the flexibility of the NRP instrument. In some cases, a strong science base provides the opportunity for an NRP, in others, a weaker science base constitutes precisely the rationale to have an NRP. More generally, the three NRPs take fundamentally different approaches towards their subject matter.

In a wider analysis, we identify five distinct NRP archetypes, of which the NRPs evaluated here represent three:

- **'Advocacy' (NRP 60):** To develop practice-oriented research findings that can support particular groups in society whose equality, dignity or inclusion is sub-optimally safeguarded by aspects of mainstream society.
- **'Decision support' (NRP 59):** To provide a neutral evidence base to support and improve debates on unresolved issues, effectively aiding all involved decision makers.
- **'Acceleration':** To move Swiss research forward in a field where particular opportunities are deemed to exist, either to foster and expand a leading position for Switzerland or to ensure 'catch-up'.
- **'Steering' (NRP 61):** To set a particular area of society on a positive, sustainable path of development in order to avoid potential risks or hazardous scenarios that may occur in the future if no intervention takes place.
- **'Orientation':** To explore an important new area of science, technology or social development and conduct an open-ended assessment of it. Novelty and consequent lack of understanding mean that focus on risks and opportunities are equally possible.

NRPs that conform to different archetypes have different needs, strengths and potential challenges. Each NRP evaluated here has a KT strategy that fits its archetype and other aspects such as the types of researchers involved are also appropriate in all cases. However, coherence, productivity and sound administration are not by themselves enough to ensure that programmes achieve their goals.

Strengthening logic, strengthening impact

While the NRPs performed well on most of the dimensions considered here, all three share a common problem: despite their academic productivity and impressive amounts of dissemination work and stakeholder collaboration, non-academic impacts have been limited. Specifically, the transition from immediate outcomes and impacts among groups and organisations closely connected to each NRP, towards wider impacts of more significant societal scale, was less successful than most stakeholders had anticipated.

The main factor behind this shortcoming was a mixture of political resistance and lack of interest in the findings, or even the topic, of the NRP. While such factors are essentially external to the programmes, it is notable that little consideration had been given to the issue of possible barriers to impact. At the same time, all three NRPs also lacked specificity in terms of success measures.

Our headline recommendation, detailed in the final section of this report, is therefore that the impact pathways – or 'logic model' – be clearly specified for future NRPs (though there ought to be some flexibility with respect to subsequent changes, should these become necessary). Not only aims, but also possible success criteria and demonstrable indicators (qualitative or quantitative, as appropriate) should be decided. It would also be helpful to conduct a feasibility assessment of the programme's suggested non-scientific ambitions at the start of an NRP, in order to highlight foreseeable barriers to achieving the impacts and ensure that programme design is adapted to address these as much as possible. This may mean simple changes like the presence of an advisory group composed of particular stakeholders, simplification of synthesis material, or the co-creation approach trialled in NRP 61. Specifying success measures and assessing possible barriers to achieving them in the design phase of NRPs will help target the KT activities and ensure NRPs are better able to fulfil their dual mission in the future, including in potentially problematic social and political contexts.

The NRPs in direct contrast

	NRP 59	**NRP 60**	**NRP 61**
Input	CHF 12m Spend on projects: 87.5% Proposal success rate: 31% 29 projects funded	CHF 8m Spend on projects: 77.5% Proposal success rate: 18% 21 projects funded	CHF 12m Spend on projects: 82.5% Proposal success rate: 23% 16 projects funded
Outputs	184 academic outputs (est.) Plus: synthesis material, outreach & dissemination material	124 academic outputs (P3) Plus: synthesis material, outreach & dissemination material, large amounts of stakeholder presentations & outreach events	191 academic outputs (P3) Plus: synthesis material, outreach & dissemination material, incl. video guides
Administration	Positive feedback on all aspects, esp. internal consensus-building & communication between projects	Positive feedback on all aspects	Positive feedback on most aspects; some concerns around communication of KT concept & project selection
Academic impact	Strong: internationally recognised publications with high citation metrics; benchmarks set for GM field trial protocols; training of new researchers; network-building	Low starting point: gender-related fields were under-developed in CH. NRP 60 produced research of low international visibility, but created an evidence base that brings CH in line with other countries; important capacity building & researcher training	Very strong: CH is an international research leader in water management. High citation metrics of published outputs; researcher training
Non-academic impact	Ample publicity and attention from practitioners, but almost no verifiable influence on Swiss GM policy	Several and varied instances of impact, but almost exclusively in organisations already interested in gender equality	Instances of successful co-creation in projects that took this approach. Less evidence of influence beyond practitioners involved directly in the NRP

Zusammenfassung

Dieser Bericht präsentiert die Ergebnisse der wirkungsfeststellenden Evaluation der Nationalen Forschungsprogramme (NFP) 59, 60 und 61. Die Studie wurde vom Schweizerischen Nationalfonds (SNF) in Auftrag gegeben und von Technopolis durchgeführt. Ziel dieser Evaluation war es erstens, die Wirkungen der drei NRP zu beurteilen (Rechenschaft), und zweitens, Lehren aus der resultierenden vergleichenden Perspektive zu gewinnen, um das NFP-Instrument in Zukunft zu stärken.

NFP 59 – Nutzen und Risiken der Freisetzung gentechnisch veränderter Pflanzen

Das **NFP 59** sollte eine Wissensgrundlage für die Entscheidung über die schweizerische GM-Politik liefern, einschließlich des Moratoriums für GM-Pflanzen. Es finanzierte 29 Projekte in einem breiten Spektrum wissenschaftlicher Disziplinen. Die meisten beteiligten Wissenschaftler waren an der ETHZ und an mehreren kantonalen Universitäten tätig. Das Programm produzierte ca. 184 veröffentlichte akademische Publikationen, von denen viele als exzellente wissenschaftliche Arbeit einzustufen sind. NFP 59 erhielt viel Aufmerksamkeit in den Medien und hatte ein relativ einfaches Wissenstransferkonzept (WT), da es hauptsächlich eine klar definierte Gruppe von Stakeholdern betraf, die vom NFP Kenntnis hatten und von dessen Ergebnissen Gebrauch machen sollten. Das NFP 59 fand allerdings in einem stark politisierten Kontext statt, der auch programmintern offensichtlich war. Trotz der Erarbeitung exzellenter wissenschaftlicher Erkenntnisse und des Vorhandenseins klarer Kommunikationswege in die Praxis, herrscht bei Forschenden, Mitgliedern der Leitungsgruppe und weiteren Stakeholdern mehrheitlich die Meinung vor, dass das NFP 59 seine beabsichtigte außerwissenschaftliche Wirkung nicht erreicht hat. Die polarisierte Debatte über GM Pflanzen hatte zur Folge, dass die vorgelegte Arbeit weder auf letztendliche Entscheidungen zum GM-Moratorium, noch auf die schweizerische GM-Politik im weiteren Sinne wesentlichen Einfluss hatte.

NFP 60 – Gleichstellung der Geschlechter

NFP 60 beabsichtigte, Erkenntnisse über Ungleichheiten zwischen den Geschlechtern in der Schweiz über verschiedene Politik- und Praxisbereiche hinweg zu sammeln, um somit mehr Geschlechtergleichstellung herbeizuführen. Eine beachtliche Menge an Verbreitungsaktivitäten wurde mit vielen verschiedenen Interessengruppen sowohl auf Programm- als auch auf Projektebene durchgeführt. Zwar hatte das Programm vielerlei außerakademische Wirkungen, doch diese traten hauptsächlich in Feldern und Organisationen auf, die bereits im Bereich Geschlechtergleichstellung arbeiteten. Bereiche von Politik und Praxis, die traditionell nicht mit Fragen der Ungleichheit der Geschlechter in Verbindung gebracht werden, konnten kaum erreicht werden. Sowohl die verfügbare Dokumentation als auch die eigenen Einschätzungen der Forschenden zeigen, dass die Auswirkungen des NFP in diesen Bereichen geringer waren als erhofft. Auf akademischer Ebene hat das NFP 60 eine mit NFP 59 und 61 vergleichbare Anzahl von Outputs hervorgebracht, wobei die Veröffentlichungen eher von nationaler als international Bedeutung sind. Das Feld Gender Studies und Geschlechtergleichstellung war jedoch zu Beginn des NFP in der Schweiz weniger entwickelt als in vielen Vergleichsländern, was die Notwendigkeit einer erweiterten wissenschaftlichen Grundlage, wie sie durch das NFP geschaffen wurde, erhöhte. Das NFP 60 leistete somit einen wichtigen Beitrag zum Aufbau wissenschaftlicher Kapazität in der Schweiz. Indikatoren internationaler akademischer Wirkung waren jedoch im Vergleich zu den anderen beiden evaluierten NFP weniger eindrucksvoll.

NFP 61 – Nachhaltige Wasserversorgung

Im **NFP 61** arbeiteten Forschende und Praktiker besonders eng zusammen. Gemeinsame Forschung war ein klarer Bestandteil des WT-Konzepts und wurde zumindest teilweise erfolgreich durchgeführt. Ziel war es, unter den Praktikern ein Verständnis und gute Praxis zu entwickeln, um nachhaltiges Wassermanagement sicherzustellen und somit den Herausforderungen des Klimawandels, der Bedrohung durch Naturkatastrophen, sowie Veränderungen in der Wassernutzung gerecht zu werden. Gleichzeitig beinhalten die besonders langfristigen Ziele dieses NFP (und die Abwesenheit unmittelbarer politischer Entscheidungen), dass die wichtigste Dimension der beabsichtigten Wirkung derzeit noch nicht vollständig beurteilt werden kann. Darüber hinaus wurden Praktiken und Verfahren

zwar entwickelt und von den am Programm beteiligten Praxisakteuren in vielen Fällen umgesetzt. Es gibt allerdings kaum Belege, dass die entwickelten Praktiken und Verfahren auch von anderen Organisationen übernommen wurden, die nicht am NRP teilnahmen und stattdessen durch Verbreitungsaktivitäten wie Präsentationen und Kurzfilme erreicht wurden. Trotz der Nähe zur Praxis hat das NFP 61 auch akademische Arbeit von hoher Wirkung hervorgebracht. Hierbei ist allerdings zu beachten, dass die Schweiz (und viele der beteiligten Organisationen) in diesem akademischen Bereich bereits weltweit führend war. Während die Verwaltung und Organisation der NFP 59 und 60 weitgehend unproblematisch war, sind beim NFP 61 in dieser Hinsicht Probleme zu vermerken. Diese waren unklare Kommunikation des WT-Konzepts mit den Forschenden, sowie eine begrenzte Fähigkeit, transdisziplinäre, gemeinsame Forschung zwischen Akademikern und Praktikern zu realisieren. Diese Schwierigkeiten sind zumindest teilweise auf das neuartige WT-Konzept des NFP 61 zurückzuführen.

Nationale Forschungsprogramme: Ein gesundes und flexibles Förderinstrument

Die drei NFP sind von ähnlicher Größe und Struktur. Es gibt hierbei keinerlei Hinweise auf Probleme, mit Ausnahme der Einteilung in ‚Module' oder ‚Cluster', die teils unnötige Trennungslinien verursachen und die Kohärenz des Programms untergraben können. Alle drei NFP waren gut organisiert und hoch produktiv. Im Durchschnitt entspricht das Ausmaß des akademischen Outputs der NFP Projekte denen aus der regulären SNF Forschungsförderung, trotz ihrer zusätzlichen Aufgabe, sich mit außerakademischen Problemen zu befassen. Die Förderung eines NFP-Projekts gilt als prestigeträchtig, wodurch sich eine große Bereitwilligkeit von Forschenden ergibt. Alle drei NFP hatten ein angemessenes Maß an wissenschaftlicher Wirkung, wobei die wissenschaftliche Ausgangssituation jeweils in Betracht gezogen werden muss: Das NFP 61 konnte auf einer einzigartig starken, international anerkannten Schweizer Forschungsbasis aufbauen, während das NRP 60 Kapazitäten in einem eher unterentwickelten Bereich erst aufbauen musste. Daher unterscheiden sich die messbaren wissenschaftlichen Wirkungen zwischen den NFP erheblich.

Die unterschiedlichen wissenschaftlichen ‚Baselines' veranschaulichen die Flexibilität des NFP Instruments. In manchen Fällen bietet eine starke wissenschaftliche Basis die Möglichkeit für ein NFP, in anderen bildet genau die schwächere wissenschaftliche Grundlage Teil der Begründung für ein NFP. Darüber hinaus sind bei den drei NFP fundamental unterschiedliche Herangehensweisen an ihre jeweiligen Thematiken festzustellen.

In einer weiteren Analyse identifizierten wir fünf verschiedene NFP-Archetypen, von denen die hier im Detail evaluierten NFP drei verschiedenen Typen zugeordnet werden können:

- **"Bestärkung" (NFP 60):** Entwicklung praxisorientierter Forschungsergebnisse mit dem Ziel, bestimmte gesellschaftliche Gruppen zu unterstützen, deren Gleichheit, Würde oder Inklusion durch Aspekte der ‚Mainstream' Gesellschaft suboptimal geschützt werden.
- **"Entscheidungshilfe" (NFP 59):** Bereitstellung einer neutralen Wissensgrundlage zur Unterstützung und Verbesserung der Debatten über ungelöste Probleme, die alle beteiligten Entscheidungsträger unterstützt.
- **"Beschleunigung":** Die Schweizer Forschung in einem als wichtig oder chancenreich identifiziertem Bereich voranzubringen, entweder indem eine bereits führende Position der Schweiz gefördert und ausgebaut, oder ein Aufholprozess in Gang gesetzt wird.
- **"Steuerung" (NFP 61):** Ein bestimmter gesellschaftlicher Bereich soll auf einen positiven, nachhaltigen Entwicklungspfad gesetzt werden, um potenzielle Risiken oder gefährliche Szenarien zu vermeiden, die in Zukunft ohne eine solche Intervention einzutreten drohen.
- **"Orientierung":** Erforschung eines wichtigen neuen Bereichs der Wissenschaft, Technologie oder sozialen Entwicklung, und Durchführung einer ergebnisoffenen Bewertung. Neuartigkeit und daraus resultierender Mangel an Wissen bedeuten, dass Fokussierung auf Risiken oder Chancen gleichermaßen möglich ist.

NFP von verschiedenen Archetypen haben unterschiedliche Erfordernisse, Stärken und potenzielle Herausforderungen. Jedes der hier evaluierten NFP hat eine zu seinem Archetyp passende WT-Strategie. Andere Aspekte, wie die Zusammensetzung der beteiligten Forschenden, sind ebenfalls in allen Fällen angemessen. Kohärenz, Produktivität und solide Verwaltung reichen jedoch nicht aus, um sicherzustellen, dass Programme ihre Ziele erreichen.

Logik stärken, Wirkung stärken

Die drei NFP schneiden in den meisten der hier betrachteten Kriterien gut ab, doch haben alle drei eine ähnliche zentrale Schwäche: Trotz akademischer Produktivität und beachtlicher Verbreitungsarbeit und Zusammenarbeit mit externen Stakeholdern waren außerakademische Wirkungen begrenzt. Weniger erfolgreich als von den meisten Stakeholdern erwartet war spezifisch der Übergang von unmittelbaren Ergebnissen und Auswirkungen bei Gruppen und Organisationen, die enger mit den NFP verbunden waren, hin zu umfassenderen Wirkungen größeren gesellschaftlichen Ausmaßes. Hauptgrund für dieses Defizit war eine Mischung aus politischem Widerstand und mangelndem Interesse an den Ergebnissen oder dem Thema des NFP. Während solche Faktoren im Wesentlichen programmextern sind, ist zu vermerken, dass die Frage nach möglichen Hemmnissen zur Programmwirkung kaum gestellt wurde. Gleichzeitig fehlte in allen drei NFP eine Spezifizierung der Erfolgskriterien.

Unsere im letzten Teil dieses Berichts ausgeführte Haupthandlungsempfehlung lautet daher, dass die Wirkungspfade – bzw. die ‚Programmlogik' – für künftige NFP klar festgelegt werden sollten (obwohl es eine gewisse Flexibilität für spätere Änderungen geben sollte, falls sich diese als notwendig herausstellen). Nicht nur Ziele, sondern auch mögliche Erfolgskriterien und nachweisbare Indikatoren (qualitativ oder quantitativ) sollten a priori klargestellt werden. Ebenfalls sollte zu Beginn eines jeden NFP die Realisierbarkeit der vorgeschlagenen außerwissenschaftlichen Ambitionen des Programms geprüft werden, um vorhersehbare Hindernisse beim Erreichen der Wirkungen aufzuzeigen, wodurch das Programmdesign weitest möglich optimiert werden kann. Die Notwendigkeit teils simpler Veränderungen, wie z.B. die Erschaffung einer außerwissenschaftlichen Begleitgruppe, der Vereinfachung des Synthesematerials oder des im NFP 61 erprobten Ansatz gemeinsamer transdisziplinärer Forschung, kann hierdurch erkannt und implementiert werden. Die Festlegung von Erfolgsmaßstäben in der Entwurfsphase, sowie die Erfassung möglicher Hindernisse für deren Erreichung, können das WT-Konzept optimieren, und sicherstellen, dass zukünftige NFP ihre Aufgabe besser erfüllen können, auch in potenziell problematischen sozialen und politischen Kontexten.

Die NFP im Direktvergleich

	NFP 59	**NFP 60**	**NFP 61**
Input	CHF 12m Budgetanteil Projekte: 87.5% Erfolgsquote für Gesuche: 31% 29 Projekte gefördert	CHF 8m Budgetanteil Projekte: 77.5% Erfolgsquote für Gesuche: 18% 21 Projekte gefördert	CHF 12m Budgetanteil Projekte: 82.5% Erfolgsquote für Gesuche: 23% 16 Projekte gefördert
Output	184 wissensch. Outputs (est.) Plus: Synthesematerial, Kommunikation und Verbreitungsmaterial	124 wissensch. Outputs (P3) Plus: Synthesematerial, Kommunikation und Verbreitungsmaterial, Viele Stakeholder Präsentationen & Veranstaltungen	191 wissensch. Outputs (P3) Plus: Synthesematerial, Kommunikation und Verbreitungsmaterial, inkl. Videos
Verwaltung	Positives Feedback in allen Bereichen insbes. Zur internen Konsensbildung & Kommunikation zw. Projekten	Positives Feedback in allen Bereichen	Positives Feedback in den meisten Bereichen; Probleme bei der Vermittlung des WT-Konzepts & Projektauswahl
Wissensch. Wirkung	Stark: International anerkannte Publikationen mit hohen Zitierkennzahlen; Benchmarks für GM-Feldversuchsprotokolle; Ausbildung neuer Forscher; Netzwerkbildung	Niedriger Ausgangspunkt: Geschlechterforschung in CH unterentwickelt. NFP 60 hat Forschung von geringer internationaler Sichtbarkeit hervorgebracht, jedoch eine Wissensbasis geschaffen, die CH in Einklang mit anderen Ländern bringt; Wichtiger Kapazitätsaufbau und Forscherausbildung	Sehr stark: CH ist international führend im Bereich Wasserwirtschaft; Hohe Zitiermaße veröffentlichter Ergebnisse; Forscherausbildung
Außer-wissensch. Wirkung	Viel Aufmerksamkeit Seitens der Praktiker, aber kaum nachweisbarer Einfluss auf die Schweizer GM-Politik	Mehrere Auswirkungen verschiedener Arten, aber fast ausschließlich in Organisationen, die bereits an der Gleichstellung der Geschlechter interessiert sind	Erfolgreicher Praxistransfer in Projekten, die diesen Ansatz verfolgten. Kaum Belege für Einfluss auf Praktiker, die nicht direkt am NFP beteiligt waren

Resume

Ce rapport présente les conclusions de l'évaluation d'impact des Programmes Nationaux de Recherche (PNR) 59,60 et 61. Cette étude, menée par Technopolis, a été commanditée par le Fonds national suisse de la recherche scientifique (FNS) et remplit deux objectifs: premièrement, fournir une évaluation *ex post* et rendre compte de l'impact des trois PNR; et deuxièmement, offrir une perspective comparative pour en tirer les leçons et renforcer à l'avenir l'instrument que sont les PNR.

PNR 59 - Utilité et risques de la dissémination de plantes génétiquement modifiées

Le **PNR 59** avait pour objectif de fournir des informations claires pour guider la prise de décision politique suisse en matière de plantes génétiquement modifiées, y compris dans le cadre du moratoire sur les cultures génétiquement modifiées. Il a financé 29 projets rassemblant un large éventail de disciplines. La plupart des chercheurs impliqués faisaient partie du laboratoire de l'École polytechnique fédérale de Zurich (EPFZ) ainsi que de plusieurs universités cantonales. Le PNR a conduit à la production d'environ 184 publications universitaires, excellentes pour la plupart et qui ont souvent suscité un écho médiatique. Le concept de transfert de connaissances était relativement simple car il s'adressait à un groupe de parties prenantes bien défini, qui connaissait le programme et comptait tirer profits de ses résultats. Le PNR 59 a été mis en place dans un contexte fortement politisé (les chercheurs impliqués dans le PNR ont eux-mêmes dû trouver un consensus malgré des avis partagés). Malgré la qualité des publications universitaires et la clarté des éléments de communication destinés à susciter une application pratique des travaux, tous les groupes de parties prenantes sont d'avis que le PNR 59 n' a pas connu atteint les objectifs non-scientifiques posés au début du programme. Les preuves présentées n'ont pas eu l'influence attendue sur le moratoire ou la politique suisse en matière d'OGM tant le débat est clivé autour de ces questions.

PNR 60 - Égalité entre hommes et femmes

Le **PNR 60** avait pour but de recueillir des données sur les inégalités de genre dans différents secteurs de la société civile et de la vie politique suisses pour améliorer les comportements. De nombreuses activités de sensibilisation et de communication ont été menées auprès des parties prenantes, tant au niveau des programmes que des projets. Bien que le PNR ait eu des impacts non académiques substantiels, ceux-ci sont observables principalement dans des domaines et des organisations déjà sensibilisées aux questions de genre. Les secteurs et de la société civile et de la vie politique qui ne sont pas traditionnellement concernés par les problématiques d'inégalité entre les sexes sont apparus plus difficiles à atteindre. La documentation existante et les investigations des chercheurs tendent à conclure que l'impact du PNR dans ces domaines a été moins important que prévu. En termes académiques, ce PNR a conduit à la production d'un nombre d'études comparables aux deux autres, même si celles-ci ont généralement été plus valorisées à l'échelle nationale qu'internationale. Il faut souligner que la Suisse avait une base scientifique comparativement très peu développée dans le domaine du genre et de l'égalité des sexes, ce qui a justifié en soi, la mise en place du PNR. Ce programme constitue donc un renforcement scientifique important pour la Suisse mais a été moins référencé à l'échelle international que les deux autres PNR étudiés.

PNR 61 - Gestion durable de l'eau

Le **PNR 61** impliquait un travail de collaboration étroite entre chercheurs et acteurs de terrains ; cette dimension de co-création qui était un élément essentiel du transfert de connaissances semble avoir été un succès. Dans un contexte de changement climatique, l'objectif était de générer une meilleure compréhension des problématiques de gestion de l'eau et la diffusion de bonnes pratiques parmi les acteurs de terrain. Le PNR doit porter ses fruits sur le long terme ce qui implique que les répercussions les plus importantes ne peuvent pas être pleinement évaluées à ce stade. En outre, il est difficile de prouver que des acteurs non impliqués dans le programme ont adoptés les pratiques et processus élaborés dans le cadre du PNR bien que ces acteurs aient fait l'objet d'actions de communication telles que des présentations et des vidéos pédagogiques. Bien que développé dans un champ très appliqué, le PNR 61 a été à l'origine de travaux scientifiques notables, la Suisse (et de nombreuses organisations

impliquées) étant déjà leader mondial dans ce domaine. Contrairement aux PNR 59 et 60, le PNR 61 a rencontré des problèmes de direction et d'organisation. Ceux-ci ont notamment été causés par la communication floue autour du concept de transfert de connaissance en direction des chercheurs, des difficultés de sélection des projets et, dans certains cas, la difficulté pour certains projets à mettre en place une approche transdisciplinaire et co-créatrice. Ces difficultés tiennent au moins en partie à l'approche novatrice du PNR en matière de transfert de connaissance.

L'instrument PNR: un outil sain et flexible

Les tailles et structures des trois PNR sont similaires et ne semblent poser aucun problème, si ce n'est la division en "modules" ou "groupes", qui pourrait ajouter des strates non nécessaires et nuire à la cohérence du programme. Les trois PNR étaient bien organisés et très productifs. Ils sont analogues, en moyenne, à la production universitaires des grands projets du FNS, en dépit de leur mission supplémentaire qui consistait à s'attaquer à des problèmes pratiques, en dehors du domaine académique. Les chercheurs présentent un intérêt fort pour les PNR et remporter un tel projet est un label de prestige. Le niveau des retombées scientifiques des trois PNR est satisfaisant, même si leur contexte diffère, par exemple le PNR 61 tendait à constituer une base de connaissance unique en son genre à l'échelle internationale, tandis que le PNR 60 devait renforcer les capacités dans un domaine encore trop peu développé en Suisse. Par conséquent, les mesures des niveaux d'impact scientifique varient considérablement entre les trois PNR.

Ce dernier aspect sur les différents "points de comparaisons" scientifiques, illustre la flexibilité de l'instrument des PNR. Dans certains cas, l'existence d'un socle scientifique permet la mise en place d'un PNR, dans d'autres, la faiblesse des données existantes constitue précisément la raison d'être d'un PNR. De manière plus globale, les trois PNR abordent de manière fondamentalement différentes les problématiques qu'ils traitent.

Dans le cadre d'une analyse plus large, nous avons identifié cinq archétypes distincts de PNR, parmi lesquels trois représentés par les programmes étudiés dans ce rapport:

- '**Plaidoyer' (PNR 60):** développer des résultats orientés vers la pratique et qui peuvent servir la cause de groupes sociaux potentiellement victimes d'inégalités, d'atteintes à la dignité ou peu intégrés.
- **'Aide à la décision' (PNR 59):** fournir une base de données neutre pour étayer et faire avancer les débats sur des problématiques actuelles en aidant de manière efficace les décideurs concernés.
- **'Accélérateur':** faire progresser la recherche suisse dans un domaine où il existe des opportunités de le faire, soit pour renforcer une position de leader, soit pour assurer un" rattrapage ».
- **'Pilotage' (PNR 61):** ouvrir la voie vers des conduites positives et durable au sein d'un secteur précis de la société afin de prévenir des risques futurs.
- **'Orientation':** explorer un nouveau scientifique, technologique ou relatif au développement social et en faire une évaluation ouverte. L'incompréhension potentiellement suscitée par l'innovation rend nécessaire l'exploration de tous les risques et toutes les opportunités.

Selon qu'ils entrent dans l'une ou l'autre de ces catégories les PNR présentent des besoins, des atouts, et des défis différents. Par exemple, chaque PNR évalué développe une stratégie de transfert de connaissance et implique des profils de chercheurs correspondant à son archétype. Malgré tout, la cohérence, la productivité et une bonne direction des projets ne suffisent pas pour que les programmes atteignent leurs objectifs.

Renforcer la logique, renforcer l'impact

Bien que les PNR aient obtenu de bons résultats dans la plupart des domaines considérés, ils présentent tous trois un problème commun: ils ont un impact limité en dehors des cercles universitaires, et ce en dépit de leur productivité en matière de publications, d'une large diffusion et de la collaboration des parties prenantes. De manière plus précise, le transfert des résultats et productions depuis les organisations intimement liées aux PNR vers la société dans sa globalité n'a pas atteint le niveau escompté.

Il a été observé que le principal facteur explicatif de cette lacune était un mélange de résistance politique et de manque d'intérêt pour les conclusions ou même pour le sujet du PNR. Bien que ces facteurs soient essentiellement extérieurs aux programmes, il convient de noter que peu d'attention a été accordée à la question des obstacles éventuels à l'élargissement de l'impact. Dans le même temps, les trois PNR ne disposaient pas non plus d'indicateurs spécifiques pour mesurer leur succès.

Notre principale recommandation, détaillée dans la dernière section de ce rapport, est donc que les cheminements d'impact - ou "cadre logique" - soient clairement spécifiées pour les futurs PNR (bien qu'il faille faire preuve de souplesse au regard des changements ultérieurs dans le cas où ceux-ci s'avéreraient nécessaires). Il ne s'agit pas seulement de fixer des objectifs, mais aussi des critères de réussite possibles et des indicateurs démontrables (qualitatifs ou quantitatifs, selon le cas). Il serait également utile de procéder à une évaluation de faisabilité des ambitions non-scientifiques au début d'un PNR, afin de mettre en évidence les obstacles à prévoir lors de la réalisation du programme de manière à veiller à ce que la conception du PNR soit adaptée pour y remédier autant que possible. Cela peut passer par de simples changements tels que la présence d'un groupe consultatif composé de parties prenantes, la simplification du matériel de synthèse ou l'approche de co-création expérimentée dans le PNR 61. Le fait de définir des indicateurs de réussite et d'évaluer les obstacles éventuels à leur réalisation dans la phase de conception des PNR aidera à cibler les activités de transfert de connaissance et permettra aux PNR de mieux remplir leur double mission à l'avenir, y compris dans des contextes sociaux et politiques potentiellement problématiques.

Comparaison directe des PNR

	PNR 59	**PNR 60**	**PNR 61**
Inputs	CHF 12m Dépensés en projets: 87.5% Taux d'acceptation des propositions: 31% 29 projets financés	CHF 8m Dépensés en projets: 77.5% Taux d'acceptation des propositions: 18% 21 projets financés	CHF 12m Dépensés en projets: 82.5% Taux d'acceptation des propositions : 23% 21 projets financés
Outputs	184 publications universitaires (est.) Plus: matériel de synthèse, de sensibilisation et de diffusion	124 publication universitaires (P3) Plus: matériel de synthèse, matériel de sensibilisation et de diffusion, grand nombre de présentations aux intervenants et d'activités de sensibilisation.	191 publications universitaires (P3) Plus: matériel de synthèse, matériel de vulgarisation et de diffusion incluant les guides vidéo.
Gestion	Retours positifs sur tous les aspects, en particulier sur la construction de consensus en interne et sur la communication entre les projets	Retours positifs sur tous les aspects	Retours positifs sur la plupart des aspects : quelques réserves sur la communication du concept de transfert de connaissance et sur la sélection des projets
Impact scientifique	Publications internationalement reconnues, avec de nombreux référencements : établissement de repères pour les protocoles d'essais sur le terrain des OGM; formation de nouveaux chercheurs, construction de réseaux.	Socle de départ faible: les études liées au genre étaient peu développées en Suisse. Le PNR 60 a produit des recherches de faible visibilité internationale, mais il a créé une base de données probantes qui rapproche la Suisse de la norme; important renforcement des capacités et formation des chercheurs.	Très forte: la Suisse est un chef de file international dans la recherche sur la gestion de l'eau. Nombre élevé de référencements des études publiées, formation des chercheurs
Impact non scientifique	Beaucoup de publicité et d'intérêt de la part des praticiens, mais presque aucune influence vérifiable sur la politique suisse en matière d'OGM.	Plusieurs exemples d'impacts variés, mais presque exclusivement dans des organisations qui s'intéressaient déjà à l'égalité entre les sexes.	Des exemples de co-création réussie dans des projets qui ont adopté cette approche. Moins de preuves d'influence au-delà des praticiens directement impliqués dans le PNR

1 Introduction

1.1 Mandate and background to this study

This document presents the findings of the impact evaluation of National Research Programmes (NRPs) 59, 60 and 61. This study was commissioned by the Swiss National Science Foundation (SNSF) and was carried out by Technopolis between January 2017 and February 2018. The three most recently completed NRPs (at the time of commissioning) were selected to be evaluated for this study:

- NRP 59: Benefits and Risks of the Deliberate Release of Genetically Modified Plants
- NRP 60: Gender Equality
- NRP 61: Sustainable Water management

The NRP instrument is coordinated by Division 4 (Programmes) of the SNSF. NRPs are the SNSF's instrument with an explicit problem-solving focus: the intention is to create programmes that address particular social, economic or political problems that imply a need for new, cross-disciplinary research insights, in turn leading to evidence-based practical recommendations, decision support, goal mapping or strategy improvements. Since the mid-1970s, 67 NRPs on a wide range of different topics have been completed, and a further 9 are currently on-going.

The mandate of this study includes evaluating the three NRPs individually, and to use the opportunity of the resulting comparative perspective to draw meta-conclusions on success factors and challenges for NRPs, thereby gaining insights relevant to the NRP instrument as a whole. Specifically, the following evaluation questions will be addressed:

- Appropriateness and relevance of the NRP
  - How well were the aims of each NRP defined, allowing researchers to suitably address the relevant political or societal fields?
  - To what extent did the participation of various stakeholders support the formulation, and then the achievement, of socio-political goals?
- Implementation and organization of the NRP
  - Was the exchange between researchers and stakeholders appropriately organised?
  - How effective were organisational structure and KT strategies? (Which criteria indicate that this was the case?)
- Socio-political effects of the NRP
  - What role did stakeholders (especially research, policy administration, associations and media) play in the socio-economic exploitation of NRP results?
  - Which impact indicators map the success of an NRP? Did other (external) factors influence the utility of the results?

1.2 Methodological note

Our study is comprised of several methodological components, creating the evidence base on which our findings and conclusions rest:

- Document analysis: a review of relevant documents for each of the three NRPs. These include annual and final reports from the programme level, final reports of each individual project funded under the programmes, minutes of steering committee meetings, as well as documents pertaining to the NRPs' creation, such as feasibility studies and proposals
- An online survey of principal investigators (PIs) of projects funded under the NRPs. Out of a total of 68 individuals, 49 have participated in the survey. A small number are either deceased, no longer contactable (e.g. due to retirement) or have opted out of online survey participation
- Bibliometric analysis (via SCOPUS) of academic outputs generated by the NRPs

- Interviews with members of each NRP's steering committee members and other key individuals at programme level. Ten interviews were conducted for each NRP
- Interviews with wider stakeholders with a view on the downstream effects of the NRPs. A total of 20 interviews were conducted: six for NRP 59, nine for NRP 60, and five for NRP 61
- To contextualise our findings alongside other NRPs, we undertook an additional step, which was agreed with the SNSF after our presentation of interim findings in September 2017: we conducted a brief document review of all completed NRPs since NRP 50. This analysis classified a total of 17 NRPs and developed a typology of fundamentally distinct approaches that NRPs take towards their subject of study. The findings of this analysis are presented in Appendix B

Further details of our methodological approach are added to this report in Appendix C. The main report first presents the headline findings on each of the three NRPs, then turns to the comparative dimension, and finally sets out our conclusions and recommendations.

1.3 Previous evaluation of NRPs

There have been several previous evaluations and impact studies of NRPs. Some of these focus on individual NRPs, notably the SNSF's internal 'Radar reports', while others have assessed the NRP instrument as a whole.[1] Most notable in this context is the 2007 impact evaluation by CEST,[2] which is the most recent comprehensive assessment of the NRP instrument. The CEST study found that NRPs generally produce high quality scientific work and conducted significant amounts of non-academic outreach and KT activities. However, it also concluded that the extent of non-academic impact of NRPs is somewhat variable, and noted two main points for future optimisation:

- Lack of systematic monitoring, documentation and reporting (especially final reporting) capable of demonstrating any achieved impacts
- Insufficiently specific definition of aims

This impact evaluation provides an opportunity to revisit the main findings from the CEST study and assess, based on the selection of the three NRPs considered here, the extent of progress that has been made against the criticisms that were noted a decade ago. We address this matter in the concluding section of this report.

[1] For one of the earliest available examples, see BBW: Begutachtung der Nationalen Forschungsprogramme (NFP). Bericht der Expertenkommission an das Bundesamt für Bildung und Wissenschaft, Bern 1994.

[2] SBF: Wirkungsprüfung: Nationale Forschungsprogramme. Studie geführt von CEST. Staatssekretariat für Bildung und Forschung: Bern 2007.

2 Evaluation report – NRP 59

2.1 Background and aims

The introduction of new traits into crops through genetic modification ('GM crops') offers a range of benefits, such as increased yields, higher nutritional content and enhanced resistance to pathogens. These potential benefits need to be set against potential risks to public health and the environment, resulting from the introduction of GM crops into the environment and from consumption of products containing GM material. However, a comprehensive evaluation of benefits and risks of GM plants remained difficult as much of the relevant knowledge was either ambiguous, not easily accessible, or may not, or only to a limited degree, be applicable to Swiss conditions.[3] NRP 59 was created against this backdrop of insufficient knowledge.

In November 2005, during the pre-programme phase of NRP 59, a 5-year moratorium on commercial GM plant releases in Switzerland was approved by popular vote. Voters on both sides emphasised the need for more knowledge to inform the decision on whether to end, extend or modify the moratorium beyond 2010.

The aim of NRP 59 was to generate scientific evidence that could feed into the political debate, including in (but not limited to) the decision on the moratorium. The programme would operate from a neutral position, i.e. neither in favour of nor against the cultivation of GM plants, and make the evidence available to decision makers. However, it would not provide a 'yes/no' answer to the question of the moratorium. The NRP implementation plan sets out the following three main aims:

- Contribute to the identification and development of plant biotechnology applications that can support Swiss agricultural and environmental policy goals
- An assessment of the current legal and administrative framework for GM plants, as well as the associated processes relating to risk assessment, risk management, and decision making
- The development of procedural standards for risk research and monitoring tailored to the Swiss context

No ex ante success indicators were defined as such. However, the findings of NRP 59 were to provide an evidence base, with the expectation that this would feed into the political debate on Swiss GM policy. The implementation plan also states that it was essential for Switzerland to maintain research capacity that would enable the assessment of benefits and risks of GM plants, to respond to developments in this area elsewhere.

2.2 Inputs

In NRP round 2002/03 (NFP Prüfrunde 02/03), two proposals on the topic of GM technology in Switzerland were submitted to the Staatssekretariat für Bildung und Forschung (SBF) / BBW. The SBF / BBW then tasked the SNSF to carry out a feasibility study and prepare a programme outline for the proposed NRP. Based on the programme outline, the Federal Council decided to progress to implementation planning of NRP 59 in December 2005. NRP 59 was to comprise four modules:

- Module 1: 50%, 6m CHF - biological, economic and public health aspects
- Module 2: 20%, 2.5m CHF - social, economic, ethical, educational, legal and political issues associated with GM plants in Switzerland
- Module 3: 5-10%, 1m CHF - risk-assessment, risk-management, and decision-making processes associated with the release of GM plants.
- Module 4: 5-10%, 1m CHF - synthesis and overview studies that evaluate existing research and knowledge on topics in Modules 1-3

[3] Nutzen und Risiken der Freisetzung gentechnisch veränderter Pflanzen (GVP). Ausführungsplan des Nationalen Forschungprogramms NFP 59.

Table 1: NRP 59 – headline input facts

NRP 59 – Key facts			
Total budget	CHF 12m[4]	**Number of projects**	29
Budget for projects	CHF 10.5m	**Disciplinary mix**	Broad: incl. Botany, Psychology, Ecology, Agriculture, legal sciences and many others (SNSF Div. 1-3 all represented)
Average budget per project	CHF 314k	**Application success rate**	Outline to proposal: 42% Proposal to project: 81% Total success rate: 31%
Budget for KT	CHF 1.5m	**Timeline**	2007 – 2013 (incl. synthesis report publication)
Programme level composition			
Steering committee (including a president and deputy president) comprised 10 experts (7 from academic institutions, 2 from government agencies, 1 consultant; 5 based in Switzerland and 5 based elsewhere). SC meetings were also attended by a representative of the Federal Office for the Environment, FOEN (Observer); a delegate of Division IV of the SNSF, and the State Secretariat for Education and Research. Additionally, the programme level included the programme coordinator, a staff member of the secretariat of SNSF Division IV, and the KT lead responsible for organising public outreach and public relations activities of the NRP. A political advisory group was established to enhance coordination between the relevant government units, and to optimise tailoring of the NRP to address the government's information needs.			

2.3 Knowledge transfer concept

Due to the controversial nature and high visibility of GM technology in the public domain, the KT concept explains that disagreements and debate between NRP researchers should not be made public. Internal dialogue was hence considered important to build a community of researchers across disciplines, leading to a consensus position (which can still include conflicting views, clearly stated). Externally, the NRP was represented by the president of the Steering Committee. External communication was to focus on 'multipliers', rather than the public at large (who would however be reached via media engagement).

The KT concept sets out three levels of communication: at the level of the entire programme, of the main themes of NRP 59 projects, and of individual projects. The NRP leadership, the SNSF, and the KT lead were responsible for programme and theme-level communication, and individual research groups for project-level communication (with KT lead support). The KT concept document sets out two types of activities: 'standard communication measures' which present the NRP as a whole (website, programme portrait, newsletter, final programme reports), and non-standard communication measures, e.g. reports on specific topics ('Themenhefte') for the expert audience; a media event at the start of the NRP; media training for NRP internal stakeholders; and the internal consensus-building.

Externally, two advisory groups were to be established: A political advisory group ('politische Begleitgruppe des Bundes') with representatives from government departments was to ensure that NRP 59 would meet the information needs of the political agenda. However, the final report notes that interest from this group was limited and little feedback was received.

Some members of the political advisory group were subsequently involved in the synthesis reporting. A synthesis report advisory group ('Begleitgruppe zur Programmsynthese), was to "serve as a platform for communicating and discussing research results as they emerge from this NRP, and for obtaining advice from stakeholders on how best to foster a constructive dialogue between scientists involved in this NRP and the wider public".[5]

[4] This was increased by CHF 1m in 2007, and by another CHF 2m following vandalism of field experiments at Reckenholz to cover additional security.

[5] NRP 59 Implementation plan

2.4 Outputs

- Our estimates indicate that NRP 59 produced 184 academic outputs (incl. journal articles, book chapters, edited volumes, etc.), yielding an average of 6.3 outputs per project.[6] At least some level of output productivity could be confirmed for all but three projects[7]
- Of the specific outputs we can confirm, 70% are peer-reviewed journal articles, indicating a strong focus on academic publishing
- At the programme level, international literature reviews on three topics were published in German and French. Key sections were also translated into English
- The programme also generated several non-academic outputs, predominantly targeted at the policy audience. These include
  - the interim report to the Federal Council (2009)
  - a 19-page report on NRP 59 research findings up to summer 2009
  - newsletters on topics within NRP 59
  - the full synthesis report, as well as a 70-page short version for a wider public, entitled 'Grüne Gentechnik in der Schweiz'
  - the final reports to Federal Council and National Research Council
- The final report to the Federal Council makes 10 recommendations for policymakers (e.g. support for R&D on GM, a decrease of administrative hurdles to enable field experiments, amendments to the principles of risk assessment to set a level playing field for all types of agriculture – e.g. enabling co-existence – and creation of 'protected sites' for field experiments)
- Module 4 led to the production of a summary of findings, addressing the programme level questions and resulting in a 300-page book. The synthesis draws together the research results of the 29 NRP-funded projects, the findings of 3 thematic cross-stakeholder workshops, and the review of international research findings relevant to the Swiss context
- Our survey responses for NRP 59 indicate that projects produced on average 3.18 non-academic publications (e.g. reports or policy papers) and 6.38 presentations to non-academic audiences

2.5 Impacts

NRP 59 is widely acknowledged to have had significant academic impact, both in terms of individual results and in terms of sustaining the Swiss science base in the field more broadly. However, there is likewise a widespread view that despite efforts, the non-academic impact has been limited, especially in relation to decisions on the GM moratorium. The difficulty around providing neutral, evidence-based input into a politically charged debate is acknowledged as the central obstacle in this respect.

2.5.1 Academic

Steering committee members considered the academic publications to be good, especially in the area of the natural sciences/plant sciences. Other research areas, e.g. legal and economic studies, was seen to have produced some important knowledge of relevance to Switzerland.

Our bibliometric analysis also shows broadly positive results in terms of reach of publications, collaboration and citation impact specifically in the body of work classified by Scopus under 'GM plants'.

[6] We present a comparator from previously analysed output data from mainstream SNSF grants. See section D.1 of Appendix D.

[7] Our research confirms zero outputs for one project, and there are another two for which our research yielded no information, though these may have also produced outputs.

Figure 1: NRP 59 – bibliometrics headline findings

- A total of 268 different author names appear for the 153 journal articles we can associate directly with NRP 59. Among the 73 researchers listed, 45 appear and 28 do not appear as authors, suggesting collaboration with 195 individuals not formally acknowledged as being directly associated with the NRP. This is an indication of significant networking and collaboration beyond the NRP itself
- 113 publications appear in 56 different peer-reviewed journals
- Almost all of these journals are listed in Scopus (indicating international reach)
- Many of the journals have a high Scimago journal ranking, indicating that these are internationally recognised publication platforms
- Tests on a sub-set of articles classified under the 'GM plants' topic show that the NRP has boosted both the overall productivity of Switzerland in this field, and has also increased the average citation impact

See Appendix A.1 for full analysis

The programme also made contributions to future capacity building in the relevant thematic areas. Survey responses indicate that on average, around one PhD student and one post-doctoral fellow were supported by each NRP 59 project. Interviewees identified a range of further academic impacts:

- Establishment of a protected site in Reckenholz, enabling Swiss researchers to conduct field experiments with GM plants. This was often acknowledged as a major important outcome for future research capacity
- A precedent for running open field trials, enabling the process of regulatory approval to be streamlined and accelerated
- New scientific partnerships, including some interdisciplinary connections
- Increased number of researchers in, and attractiveness of, the plant science research field, reducing the risk of losing the ability to perform this type of research in Switzerland

The last point is mirrored in survey respondents' views of NRP 59's contribution to sustaining research activity: more than half of survey respondents indicated that they have since continued to work on research directly related (24%) or partially related (35%) to the topic of their NRP-funded project, and were able to secure funding to do so.

2.5.2 Non-academic

It is clear that policymakers were aware of the programme and its findings. The president of the NRP 59 steering committee reported that "the interim report addressed to the Federal Council was a total success and the feedback coming from the Federal Administration was entirely positive".[8] Similarly, the representative of the Federal Administration on the Steering committee noted that the interim report initiated discussion in the Federal Council on the key messages of the interim report, such as the postulation of 'safe sites' and the impact of the results of coexistence-projects on legislation (revision of the Law on Gene Technology, GTG).

Over the period of the programme, 16 motions submitted in the Federal Parliament made direct reference to NRP 59, and 11 linked indirectly "to NRP 59 or more generally relevant to plant biotechnology". A search of the Curia Vista database[9] for the term "NFP 59" returns 32 results for the period of 2006 to 2017, including 5 motions and 14 interpellations.[10]

[8] Steering committee meeting note, 29/03/2010
[9] https://www.parlament.ch/de/ratsbetrieb/curia-vista (Parliamentary database), accessed 18 December 2017
[10] Formal questions asked of a government minister in Parliament

Ultimately, the Federal Council submitted a motion to extend the moratorium to parliament 4 months before the interim report was finalised,[11] and the moratorium was extended to 2013, with clear reference to NRP 59 and the explicit aim to allow the NRP to finalise its findings.[12]

At the end of February 2012, a motion to extend the moratorium to 2017 was submitted to the National Council – several months before the completion and publication of the NRP 59 synthesis report[13] – to allow sufficient time to evaluate the findings of NRP 59 and to make changes to the relevant legislation, the GTG[14], as recommended in the programme's conclusions. In May 2012, the Federal Council requested the approval of the motion, which was passed by the National Council in September 2012. Hence, these stakeholders stressed that the moratorium extension was to allow time to take NRP 59 findings into account and (potentially) implement recommendations.

The NRP 59 final report to the National Research Council does however set out that the political debate around the decision to extend the moratorium was aware of NRP 59, but did not take account of its results.[15] The report questions to what extent the NRP was ever in a position to fulfil its aims.

Despite the reported lack of influence on the decision around the moratorium itself, findings of some NRP 59 projects fed into policy in the years following the conclusion of the programme:

- In 2013, the Federal Council launched a consultation on regulation of co-existence, with direct reference to NRP 59[16]
- In 2016, the Federal Council published a study on the costs and benefits of GM plants.[17] The study cites NRP 59 and highlights the importance of the work on potential impacts of cultivation of GM crops, published by an NRP 59-funded project team, which it uses as its basic scenario[18]

In 2017, the moratorium was extended for a further 4 years to 2021.[19] In its 2016 motion, the Federal Council requested an extension due to remaining uncertainties and doubts, and the continued low acceptance of GM technology. At the same time, it proposed changes to the GTG to adequately regulate co-existence of GM and non-GM crops after 2021, informed by the 2016 study described above. However, ultimately, the proposed changes were rejected by the National Council and the Council of States (Ständerat). During the parliamentary debates, NRP 59 was frequently referred to by members of the councils, e.g. by 9 National Councillors in the debate on extending the moratorium (6 Dec 2016).[20]

Our survey of PIs suggests that NRP 59 may have contributed to the political and public debate, with a small number of interviewees also perceiving a shift in debates from risks towards opportunities. Respondents reported that federal and cantonal agencies took an active interest in the findings. However, it was also pointed out that the conclusions of NRP 59 did not ultimately impact on GM regulation in Switzerland.

---

[11] Final report to Federal Council

[12] Final report to National Research Council: "Das im Jahr 2005 eingeführte Fünf-Jahres-Moratorium wurde 2010 um drei Jahre verlängert, um, Berichten zufolge, dem NFP 59 einen Abschluss seiner Untersuchungen und seines Schlussberichts zu ermöglichen, bevor über die Zulassung oder das gänzliche Verbot entschieden werden soll."

[13] Final report to the National Research Council

[14] 12.3916 – Studie des NFP 59: 12 Millionen für nichts? https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20123916 accessed 19 July 2017

[15] Final report to the National Research Council: "Der Nationalrat hat in seiner Herbstsession im September 2012 diese Motion angenommen, ohne dabei die Resultate in der politischen Debatte des NFP 59 ernsthaft zu berücksichtigen."

[16] Bericht über die Ergebnisse des Vernehmlassungsverfahrens betreffend die Änderung des Bundesgesetzes über die Gentechnik (Berücksichtigung der Ergebnisse des NFP 59 und der GVO-freien Gebiete) und der Koexistenz-Verordnung. (2016) BAFU/BLW, e.g. page 17: "Neben den Erkenntnissen aus den naturwissenschaftlichen NFP 59-Projekten, die in erster Linie für die Ausarbeitung einer Koexistenzregelung auf Verordnungsstufe von Bedeutung sind (siehe Ziff. 1.1.3), wurden für die Ausarbeitung der Vorlage bezüglich der Anpassung der Bestimmungen des GTG die Resultate des NFP 59-Projekts "Koexistenz von Pflanzenproduktion mit und ohne Gentechnik – Möglichkeiten der rechtlichen Regulierung und der praktischen Umsetzung (Koexistenz-Projekt)" unter der Leitung von Prof. Dr. Rainer J. Schweizer herangezogen."

[17] https://www.newsd.admin.ch/newsd/message/attachments/44648.pdf accessed 19 July 2017

[18] Speiser, B. et al (2013) Sustainability assessment of GM crops in a Swiss agricultural context. Agronomy for Sustainable Development. 33(1): 21-61.

[19] https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20160056 accessed 19 July 2017

[20] https://www.parlament.ch/de/ratsbetrieb/amtliches-bulletin/amtliches-bulletin-die-verhandlungen?SubjectId=38797#votum80 accessed 18 December 2017

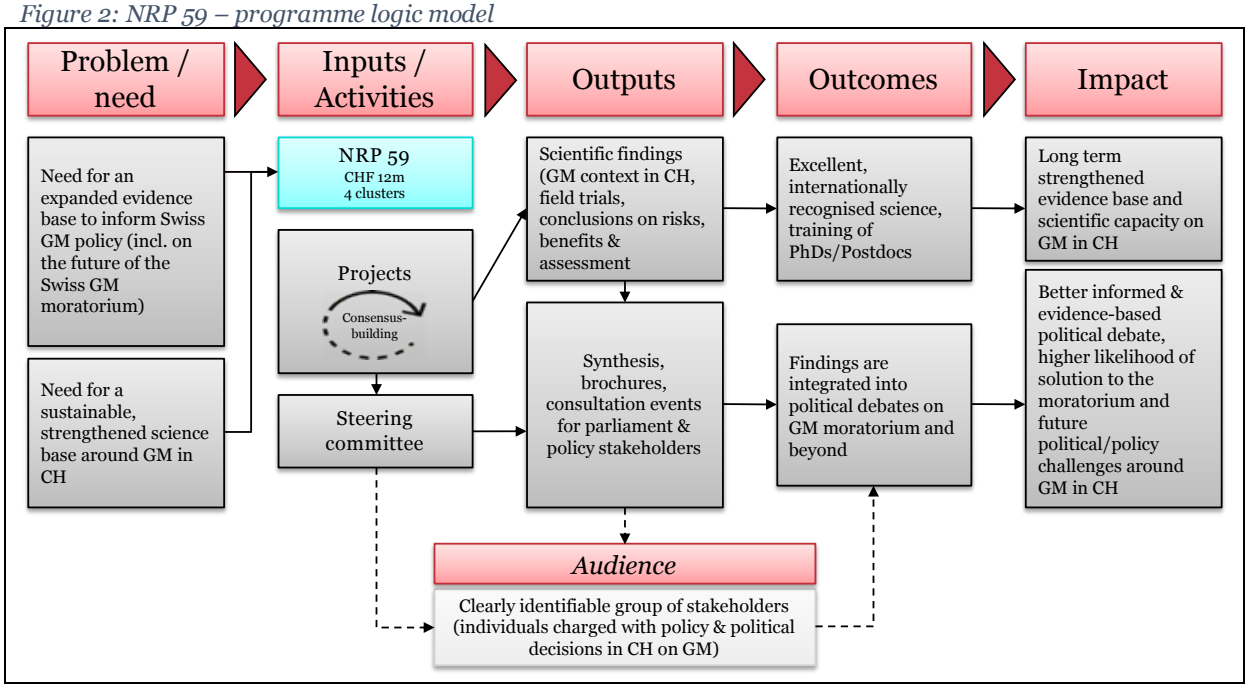
2.5.3 *Impact pathways*

It is clear from the documentation and survey that policymakers and the media were aware of NRP 59 and its findings. From the outset, the Federal Council expected to be informed, via the interim and final synthesis report. Its 2016 study explicitly states that it was based on NRP 59 funded work on co-existence. Media coverage of NRP 59 was also extensive. For example, the final conference (28 Aug 2012) resulted in the publication of "substantially more than 100 articles; hardly any newspaper failed to report on the event. National radio and TV channels reported on NRP 59, some extensively".[21] Hence, both policymakers and the public were aware of NRP 59 and its findings, supported by KT activities – and the already existing level of interest in a controversial and highly political topic.

2.6 NRP 59 – assessment of strengths and weaknesses

Based on our evaluation research, it is possible to map the intended logic of NRP 59, in other words, to visualise the justification and intended function of the programme, from the problems it was meant to address, through activities and outputs to outcomes and impacts.

Figure 2: NRP 59 – programme logic model



Realising the progression from 'inputs/activities' to 'outcomes' was highly successful in NRP 59. Our research finds no significant points of concern around administrative aspects either of the application process or over the course of the NRP. The topics included in the programme, as well as the scientific aims and disciplinary mix are generally rated highly and appear appropriate considering its aims and the scope of the topic in question. Large numbers of both academic and non-academic outputs were generated, and scientific impact and quality of the outputs have been shown in several contexts to have been impressive. Indeed, our survey results are very positive on the question of whether the NRP achieved its scientific aims. Moreover, the policy-oriented elements of NRP 59 were successfully communicated to both the targeted group of key external stakeholders, and to the wider public. The only exception in this respect is the role of the political advisory group, which is noted to have had a less significant role than was intended.

The programme level was the main site of knowledge transfer, with minor KT activities happening only in some other projects. This appears appropriate, given the relatively singular aim and practical focus of

[21] Final NRP 59 report to National Research Council. *Eine detaillierte Auswertung ist zurzeit durch das Institut für Publizistik und Medienwissenschaft der Universität Zürich IPMZ (Prof. Heinz Bonfadelli) im Gang.*

the NRP. Both our survey and interview findings suggest that the steering committee operated well, and that the internal consensus-building was successful – a small number of people involved even flagged that they changed their position on GM over the course of the programme.

At the level of 'inputs', it is worth noting that the steering committee had a strong background in the natural sciences, with a limited number of experts in the humanities (e.g. philosophy, ethics and law). This reflects somewhat the overall direction of the programme, which then focused more on the natural science aspects and indeed, is judged by interviewees to have produced more high quality and impactful work in this domain.

However, whilst we can report largely positive findings on the mid-section of the programme logic (inputs/activities – outputs – outcomes) and it's academic impact (including the protected site at Reckenholz), there is a major shortcoming at its end: the transition from outcomes to non-academic impacts. In other words, whilst communication of findings to wider audiences, and integration of findings into political discourse clearly occurred, this did not translate into concrete impacts on GM policy in Switzerland. Relating to this, there is a broad range of quite different views about the final aims and consequent expectations of NRP 59, which makes it a challenging task to assess the significance of this shortcoming.

The NRP operated in the context of significant controversy, with strong opposition to GM technology, as evidenced by the popular initiative leading to the 2005 moratorium on GM crops, and the fact that the open field trial site at Reckenholz was vandalised in June 2008.[22] There was much media attention and open communication channels to key stakeholders, and whilst the GM moratorium was in fact extended explicitly to anticipate the NRP's findings, the knowledge gained and communication undertaken did not visibly feed into decisions on Swiss GM policy.

This break in the logic chain is attributable to the nature of the debate, and was in part foreseen. Interviewees involved in the early stages of the programme noted that some stakeholders and organisations thought that this topic should not be the subject of an NRP, as the GM debate was almost beyond science to resolve it, with entrenched pro and contra factions and a fundamentalist, almost religious slant. The concern was that in the context of this ideological debate, an NRP would not be able to make any contributions palatable to either side. There were fears that the different groups would selectively exploit certain research findings to promote their pre-existing views, rather than engage in a more objective debate.

A second and related problem exists at the very start of the logic chain: whilst NRP 59 set out a short set of stated aims and objectives, it does not specify the desired practical end-result. In other words, it is unclear from the programme documentation, how and to what extent the NRP was anticipated to impact on political decisions (providing concrete policy recommendations or a yes/no answer on the moratorium was out of scope, but not intending to have any concrete influence somewhat defeats the purpose of such a programme). Additionally, no indicators of success are defined at the programme start.[23] Providing a decision or recommendation on the future of the moratorium as such was clearly not anticipated, but improving the quality of debate or allowing decision makers to resolve the issue faster are impacts that ought to have been explicitly specified. Indicators to help estimate whether or not this has occurred would likewise have been an important step to better focus the outreach activities to stakeholders, and to allow a clear assessment of success.

In this sense, NRP 59 must be judged as a well-executed programme, with the critical caveat that it did not adequately plan for the difficulty it encountered in terms of the final transfer from outcomes to impact, and did not fully define its success criteria in relation to this difficulty.

[22] SBF Aufstockung II

[23] NB: 'indicators' do not need to be quantitative. There is simply an absence of asking at the outset, what kind of observations at the end of the programme might signal success and accomplishment of aims.

3 Evaluation report – NRP 60

3.1 Background and aims

Despite 25 years of efforts and some successes at both public and private levels, de facto gender equality in Switzerland (as well as elsewhere) has still not been achieved, evidenced by inequalities in terms of educational attainment, career choice, pay levels, domestic and care work, poverty of single parents, and domestic violence.

The persistence of gender inequality is not merely explained by developments (or lack thereof) in each respective domain, but in the interactions and linkages between them. In other words, the life cycle itself creates an accumulation of linked inequalities through, for instance, subject choice at school, career choice, division of labour in the family, childcare, social support and retirement. However, little was known about these connections. It is this aspect that is most emphasised in the creation of NRP 60 as the innovative approach to be taken to address the problems at hand. Three main aims of NRP 60 are reiterated throughout the programme documentation:

- Highlight successes and failures of Swiss actions and programmes on gender equality
- Identify the complex causes for the persistence of gender inequalities in Switzerland
- Create and make available a base of knowledge and recommendations for sustainable gender equality policy and practice

At the more practical level, the programme's final report also notes the following knowledge transfer aims:

- Raising awareness in Swiss society about the relevance and importance of gender equality
- Regularly informing key stakeholders about the research results of NRP 60
- Promoting dialogue between science and practice about the research results and their practical benefits, as well as introducing possible measures
- Networking of researchers with key stakeholders of NRP 60
- Advice and support for researchers to integrate their research results into practical domains
- Ensure transparency in the allocation of resources (working time and financial resources)

The sixth steering committee meeting protocol shows evidence of consideration around success measures. In answer to the question of how success of the NRP might be 'tested'. We return to these criteria at the end of this section in the context of success criteria.

3.2 Inputs

At least three suggestions on this topic were submitted during the 2006/07 call for NRPs. The SBF (Staatssekretariat für Bildung und Forschung) developed from these suggestions a proposal for an NRP and commissioned the SNSF to conduct a feasibility study. This study was then done on the basis of an internal expert hearing of 6 research council members as well as of written comments from 27 external (foreign) experts from 9 different disciplines.

Table 2: NRP 60 – headline input facts

NRP 60 – Key facts			
Total budget	CHF 8m	**Number of projects**	21
Budget for projects	CHF 6.2m	**Disciplinary mix**	Narrow (mostly sociology and economics; all Div. 1 subjects)
Average budget per project	CHF 295k	**Application success rate**	Outline to proposal: 34% Proposal to project: 51% Total success rate: 18%
Budget for KT	CHF 369k for the programme CHF 150k for individual projects[24]	**Timeline**	2010-2015
Programme level composition			
6 steering committee members (including the president). These are all based at research or higher education institutions, 4 in Switzerland, one in Austria, one in Germany. Additionally: One delegate of the SNSF. The programme manager, one federal representative (Eidgenössisches Büro für die Gleichstellung von Frau und Mann, EBG), and a knowledge transfer manager.			

3.3 Knowledge transfer concept

Unlike NRP 59, NRP 60 did not have a small and clearly identifiable main stakeholder group. The aims and subject matter of NRP 60 are such that a considerable amount of outreach and dissemination was necessary to reach a broad range of different stakeholder groups and organisations. Preparing the findings of NRP 60 in such a way that they could be successfully implemented in the measures and activities of equality, economic, labour market, social, family and educational policymakers was critical. Several tools and actions were expected to be used in this process, most of which are noted already at early stages in the programme documentation:

- Creation and consistent expansion of a stakeholder database
- A quarterly NRP 60 newsletter
- A user-friendly NRP 60 web site to provide resources and findings
- Regular exchange with project PIs to assess opportunities for KT
- Distribution of the programme outline, findings and final synthesis report to large numbers of stakeholders
- Building contacts and exchange with strategic stakeholders and co-operators
- Exchange and events with representatives from relevant political, policy and educational fields

The programme documentation shows, across several different documents, a diverse list of stakeholder organisations which were involved in dissemination activities in various forms, e.g. as co-hosts of dissemination events, as guests at events, or who were simply in contact with the NRP at any time during its course. The programme documentation lists at least 60 seminars, meetings and other events involving external stakeholders, the great majority of which were conducted from early 2013 onwards. It should also be noted that many of the dissemination events (and indeed of some published dissemination items) did not present the NRP as a whole, but focused on the findings of particular projects.

Central in the KT concept was the idea of 'multipliers': these are organisations or individuals who would most likely show a direct interest in NRP 60, as well as willingness to attend or jointly organise dissemination activities. These multipliers would then be able to further extend the reach of NRP 60. Multipliers included organisations working in the domain of gender equality, who would therefore have

[24] Programme total: see 'Politik- und praxisbezogener Wissenstransfer 2014-2015 – Schlussbericht'; Individual project sum: see 'Projektspezifische Leitlinien im Bereich Wissenstransfer – Leitlinien zur finanziellen Unterstützung' NFP 60/03-2012.

a natural interest in the findings, above all the gender equality bureaus and commissions at federal, cantonal and municipal levels. Secondly, this included staff in other public service, charity, NGO or business organisations who had gender equality as part of their remit. Thirdly, media platforms aimed at particular fields or professions were targeted as potential multipliers (e.g. HR Today). In all cases, the approach was to disseminate findings to those most likely to have a direct interest in them, and for these individuals to then be able to drive the findings further into the policy and practice spheres where changes in gender equality policy are most needed.

3.4 Outputs

- P3 lists 124 academic publications (articles, books, etc.) for NRP 60.[25] However, there is considerable variation among the projects: five do not have any logged outputs, whilst five others have more than 12 listed outputs. Of the listed publications, 62% are journal articles, 25% book chapters (the remaining 13% are classed as 'other')
- Besides the individual outputs, there are also a number of special journal issues and collections of NRP 60 publications. Specifically, special issues in *Schweizerische Zeitschrift für Soziologie*, *Equality, Diversity and Inclusion,* and *Schweizerische Zeitschrift für Bildungswissenschaften*, as well as the edited volume, 'Gender equality in context: policies and practices in Switzerland' (Budrich Publishers, 2016)
- The main non-academic output of NRP 60 was the 65-page programme synthesis report ('NFP 60 Gleichstellung der Geschlechter – Ergebnisse und Impulse'). This was designated as a key output from the beginning of the programme, and wide dissemination was anticipated. Notably, the report includes 20 'impulses': these are not concrete policy recommendations, but findings-based insights that may better illuminate the best options for future courses of action or policy change
- The programme documentation lists a total of over 60 dissemination events that were either organised by NRP 60 programme or project-level individuals, or by external stakeholders themselves (with NRP 60 represented), or jointly organised. Over 70 different organisations are listed as attending, contributing to, or participating in these events
- The NRP 60 PIs who participated in our survey indicated that an average of over five non-academic publications and over 7 non-academic talks or presentations had resulted directly from their project
- A wide range of non-academic outputs are noted in the documentation, including:
  - Around 3-4 newsletters in each year over the programme duration, each sent to more than 2,500 stakeholders
  - A brochure entitled 'Zusammenfassungen der Projekte des NFP 60'
  - Several news media articles published, which reported on various aspects of NRP 60
  - A report on the TV News programme 'Le Journal' on Télévision Suisse Romande
  - An information letter for the National Council (Nationalrat)
  - Several news items published via collaboration with HR Today
  - A two-page article on the project 'Nentwich' in the professional journals Bildung Schweiz of the LCH (issue: 45,000) and L'Educateur of the SER (issue: 11,500)
  - An article for the professional journal 'Frauenfragen' (EKF) in German and French (2012)
  - A text for the Newsletter 'Städteinitiative Sozialpolitik' in German and French (2012)
  - Two-page fact sheets introducing the NRP 60 in German, French and English
  - A two-page article for 'Bildung Schweiz'
  - An article in 'Schweizer Arbeitgeber'

[25] We present a comparator from previously analysed output data from mainstream SNSF grants. See section D.1 of Appendix D.

3.5 Impacts

Our headline finding on the impacts of NRP 60 is that it decisively strengthened Swiss gender research, which had been limited prior to the programme. As such, the programme only produced a limited amount of internationally recognised excellent research, but national-level gaps in knowledge and research capacity were filled. NRP 60 also communicated findings to large numbers of non-academic stakeholders, and some impacts have been achieved as a result. However, there was a fundamental difficulty in transferring results, impulses and recommendations from multipliers such as interested media outlets and gender equality bureaus into higher level decision-making spheres, where political resistance or lack of interest posed major barriers to more far-ranging effects on policy and practice.

3.5.1 Academic

NRP 60 differs from the other two programmes evaluated here, in that while Switzerland already had impressive existing research strengths in the fields covered by NRPs 59 and 61, this was not so for NRP 60. Our bibliometric analysis shows that in terms of overall productivity as well as impact of research work, gender studies and gender equality are less developed in Switzerland than in other comparably sized countries with comparably advanced research systems (e.g. Belgium, Sweden). Interviewed academic stakeholders confirmed this state of affairs, noting also that there was a low number of gender-related professorships ('Lehrstühle') in Switzerland. To an extent, this low profile of gender research in Switzerland is also reflected in non-academic stakeholders' lack (prior to the NRP) of a suitable evidence base, as we outline below.

Consequently, the academic impact of NRP 60 needs to be viewed in the context of a modest starting point. The international scientific impact of the work is somewhat low: only 12 of the 61 peer-reviewed journal articles produced by NRP 60 are published in journals listed in Scopus, and tests that could be performed on parts of these outputs indicate a low citation impact. NRP 60 PIs who responded to our survey also had a more critical view than those from the other two NRPs on whether the programme had achieved its scientific aims.

However, our findings show that NRP 60 has contributed to strengthening and enlarging the Swiss research base in the field of gender equality. Several interviewees noted that creating an enlarged and strengthened research base in the field of gender equality was a central aim of NRP 60. Our findings show that this was successful.

Many interviewees noted that NRP 60 sought to include researchers in the NRP who had so far not worked with a gender-focus. These researchers would have an opportunity to bring their expertise to this field, thereby also 'mainstreaming' gender questions in other areas of social science.

Our bibliometric analysis shows that this was the case: there is only a small overlap between NRP 60 researchers and other Swiss researchers associated with Scopus-listed work on gender equality. Only three NRP 60-funded researchers and two (non-listed) collaborators were already authors in the small Swiss body of work listed in Scopus under the keyword 'gender equality' prior to NRP 60.

This indicates that the NRP-funded researchers were not necessarily experts in gender equality, but used the NRP funding to provide findings in the Swiss context on gender matters, bringing them closer to this subject area and thereby expanding the strength of this field in Switzerland. Success of this approach is indicated by the fact that, despite this inclusion from beyond the gender field, more than half of the PIs who responded to our survey noted that they have worked on projects at least partially thematically related to NRP 60 since the end of the programme.

Several interviewees also noted that a small number of new professorships in gender-related areas have been created in Switzerland, with examples pointed out for the universities of Zurich and Bern. Direct attribution to NRP 60 is not possible in these cases, but it is understood as a signifier of a strengthened field. The training of PhDs that took place within the programme has likewise contributed to this strengthening. It was noted that at least one doctoral candidate under NRP 60 now holds a professorship.

This strengthening of the field, and the creation of a body of work on gender policy in Switzerland, has also had some implications for international connections (even though the work for the most part has limited international impact): several interviewees noted that Switzerland was seen as a 'black box' when it comes to international comparative research on gender equality policy, precisely because the field was so small in Switzerland, and much analysis that had been conducted for other countries had not been conducted in Switzerland. The body of work created through NRP 60 has filled this gap. Our interviews highlighted that this has allowed Switzerland to be integrated much better into comparative international studies on gender equality, and may also have strengthened Swiss researchers' ability to join international research consortia for such activities. Interviews noted that former NRP 60 researchers have since collaborated internationally through platforms including ORA, Norface and DFG.

3.5.2 Non-academic

The NRP 60 programme documentation fundamentally expresses a perception of success at least in terms of the capacity to achieve non-academic impact and fulfil its non-academic aims. Specifically, it ties this to the Bundesrat's Legislature plan 2015-19, which states as a central aim: 'Switzerland fosters social solidarity and equality of the sexes' (aim 9).[26] Assuming that the impulses and findings from NRP 60 are suitably transferred and applied in practical spheres, contribution to this central legislative aim could be possible, and non-academic impact and fulfilment of aims achieved.

At the programme level, there is evidence that the messages of NRP 60 were effectively communicated to wider stakeholders. As noted above, there were many dissemination and collaboration events with a broad range of stakeholders, and many of these even occurred after the formal end-point of the NRP. The success of dissemination activities is also shown by the high demand for the final synthesis report: 5,600 copies of the report were sent out (3,600 in German, 1,500 in French, 500 in Italian). More than one print-run of the report was necessary, indicating that demand exceeded expectations. A high degree of dissemination and indications of keen reception by non-academic stakeholders is therefore evident.

Following from these activities, several concrete impacts of NRP 60 became evident in our research:

- The Federal Council put forward a proposed amendment to the equality law on July 2017, strengthening the audit requirements for large businesses around equal pay. The documentation cites research from NRP 60[27]
- Findings from NRP 60 were drawn on in the design of an information platform to highlight issues around the employment of carers in the home[28]
- The city of Zurich was influenced in the delivery of its programme to prevent sexual harassment. Findings around the importance of work culture (‚Betriebsklima'), rather than only formal rules and regulations, led to a shift in emphasis of what the prevention work addressed
- The organisation ProFamilia has created an information platform on the compatibility of work and family life, which cites and draws on findings from NRP 60[29]
- The canton of Zurich has launched a pilot project to encourage gender a-typical career choices among young people. ‚Berufsgerecht' is funded by the EBG, and NRP 60 was noted as being catalytic in starting the project, as well as providing part of the evidence base to justify funding it[30]

The findings of NRP 60 have also been noted in various reports, plans and motions in the policy and political sphere. The following could all be confirmed in our research:

[26] https://www.newsd.admin.ch/newsd/message/attachments/42731.pdf (accessed 01/02/2018)

[27] https://www.bj.admin.ch/bj/de/home/aktuell/news/2017/ref_2017-07-050.html (accessed 01/02/2018)

[28] www.careinfo.ch (accessed 01/02/2018)

[29] www.jobundfamilie.ch (accessed 01/02/2018)

[30] https://ffg.zh.ch/internet/justiz_inneres/ffg/de/aktuell/medienmitteilungen/mm_berufsgerecht_startet.html (accessed 01/02/2018)

- A small number of Parliamentary motions (or responses to them) refer explicitly to NRP 60[31]
- The Federal Office for Gender Equality (EBG) has been using the results of NRP 60, especially the Synthesis Report, in its regular work, for example as a reference document in communication with the UN Commission on the Status of Women
- The commission report on start-up financing by WBK (Kommission für Wissenschaft, Bildung und Kultur) (PI 13.451) refers to the research findings of NRP 60
- An article by the steering committee president of NRP 60 is cited in the Bundesrat report, 'Unterstützung für betreuende und pflegende Angehörige. Situationsanalyse und Handlungsbedarf für die Schweiz' (05.12.2014)
- For its action plan for equality 2015-18, the City of Bern used the findings and impulses of NRP 60 as an important foundation ('Aktionsplan zur Gleichstellung 2015–2018')
- The same is the case for the EBG (Eidgenössisches Büro für die Gleichstellung von Mann und Frau) in its nationally disseminated 2014 report ('Bilanzbericht 1999-2014')

There are almost certainly several further examples of such impacts and further uses in official documentation that could not be identified by our evaluation research: many interviewees suggested there may be more but, given the time-delay, the best people to speak to are no longer around, or definitive attribution to NRP 60 is no longer possible.

A degree of non-academic impact is therefore clearly present. It should also be noted that these impacts stemmed both from the programme level (i.e. through exchange and dissemination organised by the steering committee) as well as from individual projects or combinations of projects (sometimes with input and support from the steering committee, sometimes without).

However, almost all examples highlighted here share a common characteristic: they resulted from direct involvement or initiative of people or organisations that were charged with matters of gender equality and had a clear interest in this subject matter even prior to NRP 60. Our research has found little evidence that the findings of NRP 60 also extended into fields of policymaking and practice that had more limited prior interest in this field, but whose actions affect issues around gender equality. In this sense, the impact of NRP 60 is limited.

NRP 60 successfully communicated to groups with a prior interest in gender equality, who in turn were able to use it. Moreover, our interviewees from this group, particularly those working in equality bureaus and commissions, noted without exception that NRP 60 provided them with an evidence base that strengthened their arguments and political advocacy work (including at the parliamentary level). At this point however, barriers become apparent: many interviewees noted that outside of organisations working on gender equality, there was evident disinterest in findings, or even political resistance, which is also acknowledged by many project leaders in our survey. Across our research, many areas of policymaking, as well as many organisation types and political/parliamentary factions and business sectors were mentioned, who signalled little interest or response to NRP 60. It is possible that individuals in some of these spheres were 'sensitised' to gender issues through the programme, but there is no evidence of such shifts.

It appears therefore, that despite its best efforts, NRP 60 failed in some respects to include and involve organisations that do not have an explicit focus on gender equality. Given the aim to integrate different areas of policy and practice around gender equality, this is problematic. Consequently, the view from NRP 60 participants is mixed: only 33% of our survey respondents believe that the non-scientific aims of NRP 60 were achieved 'to a large extent', which compares favourably with NRP 59, but is far less than in NRP 61. While many interviewees were able to point to examples of influence on policy and practice, the dominant view is that the impact has been less than what was hoped.

[31] Motions 14.3417, 13.4154, 13.4072 and 11.3060. NRP 60 is noted in one further parliamentary motion, in 2008, prior to its start, and asking whether inclusion of the topic of domestic violence will be included in the scope of the programme: https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20083791 (accessed 01/02/2018)

3.5.3 *Impact pathways*

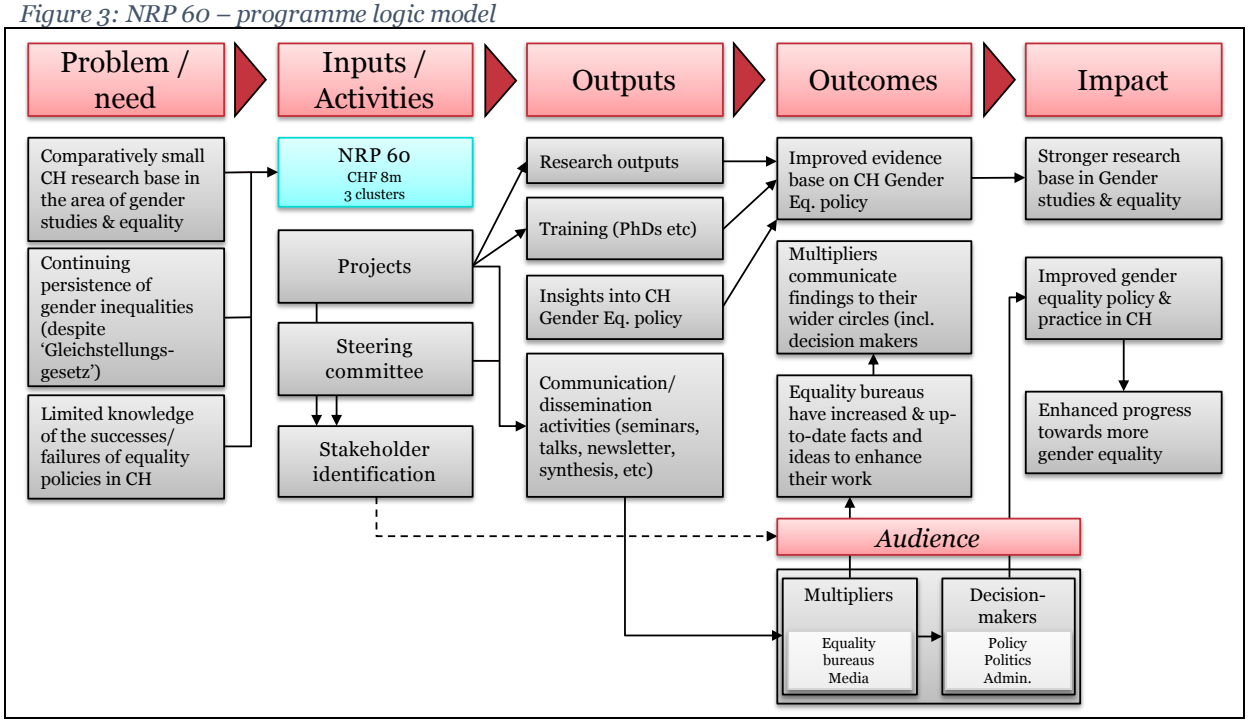
The programme documentation suggests that four components were especially critical in terms of non-academic dissemination of the NRP 60 findings, and thus constitute important pathways to impact: the final synthesis report; the NRP 60 web site; The NRP 60 newsletter; and meetings where NRP 60 findings (occasionally of particular projects) were presented or discussed.

In addition to the high demand for the synthesis report noted above, there is also evidence that the web site was a helpful tool for dissemination purposes: The 2011 annual report for NRP 60 notes that the web site was visited 7,233 times, with an average of 2.26 minute visits and just under 4 page views. The 2013 annual report notes that this figure rose to over 12,000 visits.

3.6 NRP 60 – assessment of strengths and weaknesses

NRP 60 has a clear programme logic that can be mapped based on our evaluation findings. The identification of stakeholders – and especially of 'multipliers' – is an important part of the programme's activities, and is an important device in the envisaged pathway to impact.

Figure 3: NRP 60 – programme logic model



NRP 60 produced a suitable volume of scientific outputs, across several social science disciplines and covering a broad thematic range, as anticipated, although it should be noted that legal aspects – potentially critical to the subject matter of the programme – are absent, by the NRP's own admission, as no proposals of suitable quality were submitted in this domain. Additionally, five projects have no listed outputs in P3, which gives NRP 60 the highest rate of non-productivity of the three programmes evaluated here. Within this limitation, the NRP succeeded in terms of its scientific logic: from a low starting point, the field was strengthened by filling research gaps and strengthening the research base.

The identification of, and communication to, external stakeholders was successful, at least as far as 'multipliers' are concerned. Where these multipliers were able to implement policy and practice changes, there are many signs that non-academic impacts did occur. Moreover, the evidence base created by NRP 60 was used in the advocacy efforts of many organisations involved in the subject of gender equality.

However, both internal and external stakeholders reported the presence of political resistance or disinterest. This posed limitations on the transfer of findings and, consequently, on the extent of impact from the 'multipliers' to the 'decision makers'.

The aims of NRP 60 are set out in the programme documentation. However, these tend to be secondary aims (creating knowledge, raising awareness) and do not posit concrete impacts that ought to result from the programme's activities. The minutes of the sixth steering committee meeting go further, setting out a provisional range of success criteria. These are worth considering here, despite not being formalised as such. We can note, based on the available documentation, the extent to which success has been achieved on the suggested measures. What is particularly striking is that, whilst success criteria were set out, the majority of them do not lend themselves to assessing whether aims have been met. Success measures set out at the programme start would have needed to be more specific, with clearer criteria and attached indicators specified. As such, it cannot be fully determined whether the observed limitation nevertheless allow us to speak of a successful programme.

Table 3: NRP 60 – achievement against pre-determined success measures

Success measure (set out in minutes of the 6th SC meeting)	**Achievement**
Synergy effects are observable (NRP 60 is more than the sum of its individual projects)	Unclear: many findings are theme-specific; whether the impacts or recommendations are genuinely synergistic is questionable
Creative proposals for gender practice and policy (at institutional and legal levels, etc.)	Generally achieved, though the level of 'creativity' is unclear
Interesting results (knowledge progress)	Unclear: 'interesting' is not clearly defined
Results are relevant to practical implementation/application	Achieved (the 20 'impulses' have precisely this perspective)
Input of results into practice	Achieved, though it is unclear how relevance should be assessed
Central stakeholders "live" / Initiate recommendations from the programme	Unclear; needs more definition
Good scientific publications	Debatable: comparatively low starting point means internationally recognised scientific quality is low, but important 'catch-up' and improved evidence base occurred. What were the expectations?
Impact of the results in practical fields	Achieved, though the scale of anticipated impact is unclear
A high score in the NRP radar or other evaluation	n/a
Evaluation 2 years later by EBG, EKF, or by other groups	n/a
The existence/creation of a "Gender Conference" (analogous to the Islam Conference)	Not achieved
Meeting(s) with political party representatives; formal and informal exchange	Achieved, though selective: much outreach has taken place, but generally with groups already interested in gender equality. Little exchange with other groups. Unclear if this constitutes failure.
Longevity: citing of the results, both from project level as well as at program synthesis level	Unclear (cannot be fully determined at this point)
Dialogue groups, alliances between science and practice (e.g. ThinkTanks)	Partially achieved, but the strength of these alliances is unclear.
Results flow into the lobby work Of the NGOs	Achieved. However, many intended audiences have also shown little interest. What scale of 'flow' was intended

4 Evaluation report – NRP 61

4.1 Background and aims

Unlike NRPs 59 and 60, NRP 61 on 'Sustainable Water Management' was not implemented because of an ongoing political debate or an urgent political problem. Switzerland currently has a secure supply of water, but may face challenges in the future with respect to water management as a result of climate change, natural disasters or changing use structures. NRP 61 intended to facilitate analyses on the most important problems and challenges of the supply and usage of water resources. The research was to be forward-looking and pro-active, with a preventive character and no pressure of pending political decisions. The implementation plan also highlights the need to focus both on the 'nature system' (studying changes in the water balance in connection with consequences of climate change and changing use structures) and the 'social system' (developing improved management mechanisms).

A critical component of NRP 61 was the concept of transdisciplinarity, meaning that researchers and final beneficiaries of the research results (policymakers or companies) work and research together from the very beginning of the project (co-creation of knowledge). Closely linked with this was the knowledge transfer concept of NRP 61. The researchers were required to contribute to the practical implementation of their research results. Elements of the KT concept had to be included in the application for research funding under the NRP. According to the implementation plan, the aims of NRP 61 are as follows:

> *[...] development of tools, methods, and strategies that make it possible to find answers to the future challenges of water resources management in Switzerland. This concerns the load-bearing capacity of the natural systems under changing environmental conditions, dealing with the risks and use conflicts from a comprehensive perspective, and efficient management systems for sustainable prevention in water management.*[32]

The knowledge transfer concept determined the following qualitative indicators or evaluation questions to assess the success of the knowledge transfer:

- Were the relevant problems identified?
- Were relevant practitioners involved from the beginning?
- Were solutions in the public interest generated (practical knowledge and action)?
- Were the boundaries of the scientific domain crossed? If so, how?
- Were differing points of view taken into consideration?
- Was the research process designed in such a way that co-creation of knowledge was possible?[33]

4.2 Inputs

The implementation plan and the aims of NRP 61 are the result of a discussion process that commenced with the submission of the proposal to implement a new NRP on sustainable water management, following a call published in early 2006 by the SNSF. The process from the submission of the initial proposal in March 2006 until the publication of the implementation plan in October 2008 encompassed a feasibility study and the approval process. The final implementation plan on which the call for project proposals was based was developed by the NRP's steering committee. At its first meeting, the steering committee discussed possible modules of the NRP. A working group was set up that coordinated the decision process on the research modules and the implementation plan.

[32] Ausführungsplan 2008, p. 8

[33] Umsetzungskonzept, February 18, 2010, p. 20

Table 4: NRP 61 – headline input facts

NRP 61 – Key facts			
Total budget	CHF 12m	**Number of projects**	16 (+6 synthesis projects)
Budget for projects	CHF 9.3m (excl. synthesis, 9.9m incl.)	**Disciplinary mix**	Medium (mostly Hydrology & environmental science; some additional social science)
Average budget per project	CHF 579k (excl. synthesis, 448k incl.)	**Application success rate**	Outline to proposal: 27% Proposal to project: 89% Total success rate: 23%
Budget for KT	CHF 991k	**Timeline**	2010-2015
Programme level composition			
The steering committee consisted of 7 members (including the president). These seven individuals were based variously in Switzerland, Austria and Germany, at universities or research institutes. Additionally the programme level included an SNSF delegate, a KT manager, a federal representative (Abteilung Wasser, Bundesamt für Umwelt BAFU, Bern) and a programme coordinator. Additionally, the programme had the assistance of an advisory council (Programmbeirat) consisting of ten individuals from various policy-related organisations (e.g. Amt für Umwelt, Kanton Solothurn, Abteilung Wasser, Bundesamt für Umwelt BAFU, Schweizerischer Wasserwirtschaftsverband SWV, Schweizer Verein des Gas- und Wasserfaches SVGW)			

Three different levels were initially distinguished: the project level, the cluster level and the programme level. At the cluster level, the 16 funded research projects were grouped into two clusters. The logic behind this clustering was that the project level was regarded as too specific and the programme level was regarded as too general, both for knowledge exchange between investigators of the individual research projects, and for knowledge transfer to the interested public. The two clusters ("hydrology" and "water management") were also defined with the intention to foster the scientific exchange among researchers from various projects that work in similar fields. However, it turned out that there were many overlaps between projects from the different clusters, so the idea of structuring the projects of the NRP into clusters was abandoned. In addition, project leaders indicated that a cluster level would lead to too many meetings and an excessive effort to coordinate the work within the clusters.

For the final reporting, four thematic syntheses were to be produced. The aim was to define four research topics of interest to different groups of potential stakeholders. The definition of the thematic syntheses did not group the individual research projects but was content-driven.

4.3 Knowledge transfer concept

NRP 61 had an elaborate KT concept. Even the phrase 'knowledge transfer concept' is too narrow, since the KT concept of NRP 61 is not only based on the idea of transferring knowledge and information,[34] but to initiate actions at the level of stakeholders. Dissemination of scientific expertise was regarded as insufficient to initiate actions. Social interactions between scientists and stakeholders were deemed decisive, using informal meetings and networks. Within these, learning processes were to be initiated that eventually lead to actions. The KT concept of this NRP can be described as having a theory of change, since it systematically elaborates how a change of actions should have been initiated by the funded research.[35] The change of actions might take several years after the completion of the project, but should be sustainable and long-lasting. An important element of the KT concept is the transdisciplinary

[34] In German, the documents use the terminology "Umsetzungsstrategie" and "Umsetzungsplan", i.e. implementation strategy and implementation plan. The transferred knowledge is implemented only if practical actions are initiated by this knowledge.

[35] A theory of change (TOC) is a tool for developing solutions to complex social problems. A TOC articulates the assumptions about the process through which change will occur and specifies the ways in which all of the required early and intermediate outcomes related to achieving the desired long-term change will be brought about and documented as they occur. (adapted from Anderson, A. (2005). The community builder's approach to theory of change: A practical guide to theory and development. New York: The Aspen Institute Roundtable on Community Change).

research that is mandatory for all projects of NRP 61. Four practical guidelines for transdisciplinary research were developed, which also served as selection criteria for the decisions about which projects were eventually funded:

- Practitioners are to be included in the research from the start
- Knowledge systems are to be connected, different viewpoints integrated, and knowledge co-created
- Researchers expand their role: aside from producing knowledge, they also coordinate and moderate networks
- The research process is to be open: communal problem definition marks the starting point of the research process. Including practitioners in the entire process enables all involved persons to have 'ownership', thus creating trust[36]

At the programme level, a synthesis report was compiled summarising the key results of the whole NRP. In addition, PR activities were carried out by the PR staff of the SNSF office, targeting the general public, in particular at the national level, by informing about the main results of the NRP (awareness raising). A fact sheet that synthesises the most important, politically relevant results targeted interested policymakers (political synthesis). After the completion of the project, ten video modules were produced with the intention to provide "foresight" by presenting instructional knowledge on how to implement new actions and solutions in practice.[37] The video module should contribute to the initiation of learning processes among stakeholders.

A national advisory group was implemented at the programme level (Programmbeirat), which advised the steering committee and served as a link between science, politics, administration, the economy and civil society. The members of the advisory group represent different actors in the field of water management, including different groups of water users (e.g. agriculture, forestry, water suppliers). Moreover, the advisory group represented regional authorities, since in Switzerland the cantons are responsible for issues related to water management. The NRP intended for the exchange of knowledge and information that took place during the meetings of the advisory group to continue in other existing networks, such as the "Wasser-Agenda 21", once the NRP was completed.

Three workshops were organised that specifically addressed KT activities. The question of how to implement transdisciplinary research was discussed at a workshop in November 2010. In 2014 (i.e. after the completion of the research work), two final workshops were held. One workshop entitled 'Dialog mit der Praxis' evaluated the practical implementation of the research results. The second workshop discussed the results of the accompanying research.

4.4 Outputs

- A total of 191 academic outputs are logged for NRP 61 on P3, averaging 11.9 per project. In these pure numerical terms, the productivity levels are significantly higher than in NRPs 59 and 60[38]
- In addition, 38 PhD students were supported, corresponding to an average of 2.4 per project
- Our survey results indicate that on average, researchers from the individual projects produced 5 non-academic publications (e.g., policy reports, briefing papers, consultancy reports) and 8 non-academic talks or presentations (e.g. talks at dissemination events, training events for policymakers/practitioners) that resulted directly from the project
- Individual projects organised workshops with stakeholders and policymakers expected to implement the research results. Examples of such workshops are an information day at the Swiss

[36] KT concept, February 2010, p. 7

[37] The initial plan was to produce five video modules, which was extended to ten modules at later stages of the programme.

[38] However, should be noted that NRP 61 also had fewer, larger projects than the two other NRPs, so whilst the total number reflects genuinely higher output quantity, the per-project average does not reflect this to the same extent. We also present a comparator from previously analysed output data from mainstream SNSF grants. See section D.1 of Appendix D.

Federal Institute of Aquatic Science and Technology and the workshop "Drought and Agriculture" organised by the two groundwater projects of the NRP

- A number of other workshops were organised during the duration of the NRP:
  - Two synthesis workshops addressed the creation of the various synthesis reports (thematic synthesis, overall synthesis)
  - In November 2010, a cooperation meeting was organised, which aimed to bring together researchers from the NRP 61 with researchers from other ongoing projects on water research in Switzerland. This workshop represented the nucleus of a network of researchers in the field of water research that could lead to research collaborations even after the completion of NRP 61
  - Finally, a workshop on climate and socio-economic scenarios was organised in October 2010. The workshop discussed scenarios that were later used for the development of scenarios on future water usage and management until 2050
- The four thematic synthesis reports compiled the research results generated by the individual research projects. The target audience of the thematic level were policymakers and experts at federal, cantonal and lower levels), NGOs and private enterprise
- At the programme level, a further synthesis report was compiled, summarising the results of the whole NRP. The target audience of the synthesis report was the interested public
- Ten video modules were produced with the intention to provide "foresight" by presenting instructional knowledge on how to implement new actions and solutions in practice
- General PR activities were carried out by the staff of the SNSF office, notably a fact sheet synthesising the most important politically relevant results targeting interested policymakers

The NRP Final Report assessed the academic output of the NRP as follows:

> *... objectives have been substantially achieved. Though some minor adjustments were necessary in places (for instance due to lack of the necessary finances, problematic data findings or over-ambitious assumptions of researchers), it was possible to establish the essential foundations for the formulation of the measures for sustainable water use In Switzerland.*[39]

4.5 Impacts

4.5.1 Academic impact

The surveyed PIs indicate that the scientific aims of NRP 61 were fulfilled. Next to the impressive raw numbers of publications as such, our bibliometric analysis confirms that much of the work was published in high-quality journals and has substantial impact.

Figure 4: NRP 61 – bibliometrics headline findings

- 113 (60%) of the publications appeared in 56 different Scopus-listed peer-reviewed journals
- 18 of the 56 journals are classified in 'water science and technology' – the majority of the articles here are within the top 25% of journals with the highest impact in the category; Over 26 articles are published in the top-10 journals in the field by Scimago rank
- The peer-reviewed articles obtained on average 6.9 citations per publication
- There is a low share of non-cited publications (8.5%)
- 74 of the 93 participant researchers of NRP 61 are authors in the list of publications. An additional 438 other authors also appear in the list, indicating significant network formation (and in some part also achievements of the many PhDs supported through the NRP)

[39] NRP 61 Final Report, p. 30

The steering committee also voices satisfaction with the academic output of the programme. Nevertheless, the final report points to a problem of academic research in the context of an NRP:

> *A basic problem inherent in NRPs also manifested in NRP 61: the researchers felt at least partially overwhelmed by the dualism of goals: on one hand, published science, and on the other, practicable, applied research in close cooperation with stakeholders from practice. There needs to be further consideration of how to square this circle.*[40]

The impressive academic results of NRP 61 therefore appear especially noteworthy, given its strongly applied, co-creating focus. However, these findings must be seen in context: our bibliometric analysis also shows that Switzerland is a world-leading country in this research area, not in terms of quantity, but in terms of the impact of the work that is produced: over a 20-year citation window (1996-2016), Swiss journal articles on water technology and management receive an average of over 24 citations, making Switzerland the leading country Europe in this respect. Moreover, this Swiss specialism is largely concentrated at EAWAG, ETHZ, and, to a lesser extent, small groups in some cantonal universities. This closely connected group also formed much of the personnel base of NRP 61, and so continued the trend of producing high-impact outputs. Whilst the citation metrics are therefore impressive on their own terms, it is impossible (given the much shorter citation window) to assess whether they are actually on par with previous achievements.

In the context of the above quote, a programme so removed from pure basic research might have struggled to create internationally excellent academic research. However, this has been at most a limited problem here and has meant, at the very worst, that the extent of excellent, impactful academic work may not have been quite in line with the world-leading track record of Swiss research in this field.

Beyond the impacts of scientific outputs, the long-term academic effect of NRP 61 depends on whether the research is continued after the completion of the NRP. In our survey, 80% of project leaders reported that they started working on research that was a direct or partial thematic continuation of their NRP project. All of these individuals had secured new research funding to do this research. The comparatively large number of supported PhDs is additionally an important indicator that NRP 61 has led to expanded future research capacity in this field.

4.5.2 Non-academic impact

In non-academic terms, the picture around NRP 61 is complex: the involvement of practitioners in the research itself, as well as close exchange with a political advisory group has meant that impacts are evident as far as the stakeholders directly connected to the programme are concerned. However, the extent of impact beyond these groups appears to be limited. This caution is somewhat mitigated by the fact that the water management community in Switzerland is of a limited size and quite inter-connected. Further, our findings suggest that a long-term impact trajectory is to be anticipated, where impacts observable at this point in time are inevitably limited, given the long-term nature of the problems that NRP 61 aimed to address.

The steering committee voices positive views on the non-academic achievements of the NRP. The self-assessment of the steering committee on the success of the KT concepts and the non-academic impact reads as follows:

> *The NRP 61 researchers have successfully implemented transdisciplinarity in their projects. Where thematically appropriate, practitioners were involved in the projects. Target, system and action know-how were generated, and solutions for sustainable water use were developed together.*
>
> *The knowledge transfer objectives have been achieved: the relevant actors have been integrated. They could contribute their knowledge to the advisory council. The*

[40] NRP 61 Final report (2015)

> *involved practitioners have already been able to implement the lessons learned to some extent. However, follow-up projects and further translation work between research and practice are still to be made.*[41]

Our interviews suggest that one of the main beneficiaries of the NRP is the BAFU (Bundesamt für Umwelt), which actually initiated the NRP. After the completion of the NRP, the BAFU provided financing for some projects, enabling them to continue their research. This emphasises the importance the NRP had for the BAFU.

Research results have already been implemented in practice in some areas:

- The final report on knowledge transfer reports on the implementation of the platform Drought-CH (www.drought.ch) for early recognition of critical drought
- Surveyed project leaders describe other examples like an approach that is used in Switzerland and abroad by water managers (cantons, distributors, private companies) for the understanding of underground flows
- Numerous workshops and information events were organised in the context of the NRP, which attracted interest from practitioners. For instance, one third of the 90 participants of the workshop "Dialog mit der Praxis" were external stakeholders and practitioners[42]

To produce sustainable, long-lasting (non-academic) impacts, the NRP focused on building up and establishing networks. It was the explicit goal that networks established during the duration of the NRP were maintained even after the completion of the NRP. In particular, the knowledge exchange with those stakeholders and practitioners that were members of the NRP's advisory groups was intended to continue through the platform "Wasser-Agenda 21".[43] However, according to interviewed stakeholders, communications through platforms like the "Wasser-Agenda 21" play a minor role and new networks were not created by the NRP. This is partly because Switzerland has a small community in the field of water management so that all relevant stakeholders are already linked to each other.

There was diffusion of knowledge about the research results of NRP 61 into federal or cantonal administration or water and energy suppliers. If appropriate, information was also spread to municipalities within the cantons. In other words, relevant external stakeholders were well informed about the results of the NRP. However, our research suggests that the research results have not so far been used or implemented by stakeholders other than those connected directly to the NRP.

Interviewed end-users like farmers or representatives from power stations, some of whom contributed to the videos produced to demonstrate potential applications of the research results, appreciated the quality of the research that was done within the NRP. However, interviewees from this group reported that the tools or methods that were produced by the NRP are of limited practical use for them. For instance, the information is provided on a highly aggregated level, so that the tool or the method might be useful for decision makers at the federal or cantonal level, but that it is not useful for daily business decisions at the level of an individual farm or power station. Nevertheless, interviewees reported that they follow the results of the NRP and that this had an influence on their long-term business strategy, since the NRP showed expected long-term tendencies with respect to the availability of water resources. It should however be noted that these observations are based on a small number of interviews. There may be other projects within the NRP that did involve end-users in the research process so that the tools or methods produced are more relevant to their daily work. Nevertheless, the cases described here may reflect potential obstacles for the practical implementation of research results by users such as farmers or power stations.

Interviewees emphasised that it would be unrealistic to expect many political changes being implemented just two or three years after the completion of the NRP: the infrastructure for water supply

[41] Knowledge Transfer in the NRP 61: Final Report (2015), p. 2f

[42] Knowledge Transfer in the NRP 61: Final Report (2015), p. 9

[43] There are no data on whether researchers and stakeholders continued to communicate through "Wasser-Agenda 21".

and water management was built for an economic life of 50 years and cannot be changed or replaced within a short time period. Indeed, the majority of our surveyed project leaders observed an improved ability to make political decisions either at the cantonal level (8 out of 11) or at the Swiss national level (6 out of 11). The fact that political leaders can now make better decisions is an important step in a change process. But very few reported that cantonal or Swiss national government policy did actually change as a result of the NRP, either through the creation a new government policy or by changes to existing policies. This might be because political decision making processes can take years until a government policy is finally changed.

On the political level, the limited observed changes might also result from the precautionary character of the NRP. There are no urgent political problems that the NRP addressed so that there is no need for an immediate implementation. Interviewed three years after the completion of the NRP, stakeholders still believe that some of the results are likely to be implemented in the future.

4.5.3 Impact pathways

To produce sustainable, long-lasting non-academic impacts, the NRP focused on building up and establishing networks. It was the explicit goal that networks established during the NRP (through co-creation with practitioners and exchange with the advisory group) were maintained even after the completion of the NRP.

The aim of raising awareness among the general public on problems with respect to water management was addressed using general and specific PR activities (including presentations on Swiss television) as well as presentations, workshops and videos. The use of the videos was evaluated in an accompanying research project.[44] The authors evaluated whether the use of videos can support the KT to stakeholders.[45] This evaluation notes that the videos have been viewed a total of over 44,000 times, and that surveyed stakeholders described the videos as informative, attractive and interesting. No further claims are made about verifiable downstream effects of the videos, but the reach of this pathway is certainly evident.

There were regular meetings of the working groups at the project level and the national advisory group at the programme level. Both groups consisted of stakeholders so that the meetings offered opportunities for networking activities with researchers and mutual learning. The networking activities established during the NRP should continue after the completion of the NRP using other platforms like the "Wasser-Agenda 21".

The main transmission channel to achieve non-academic impact was the requirement for all research projects to conduct transdisciplinary research. Another accompanying research project investigated the transdisciplinary research processes in the NRP 61 projects, as well as facilitating and hindering factors. The authors of the accompanying research identify:

> *…a big variety of transdisciplinary approaches and methods. The approaches applied ranged from rather classical research designs where stakeholders were informed about the goals and results of the project, to complex designs were stakeholders were part of the research team and co-produced knowledge together with researchers.*[46]

The interviewed programme-level individuals indicated that among the received proposals only very few showed an elaborated transdisciplinary KT concept. As a result, some projects were selected despite a poor focus on transdisciplinary research. This means that during the duration of the NRP many projects

[44] Müller, U. & Backhaus, N. 2016. Einsatz und Wirkung von Videos in der Umsetzung und Kommunikation von Forschungsergebnissen: Evaluation der NFP 61-Videos und Ableitung allgemeiner Empfehlungen, Forschungsbericht, Wädenswil.

[45] The videos were also used to reach the general public. However, this was not included in the scope of the accompanying research.

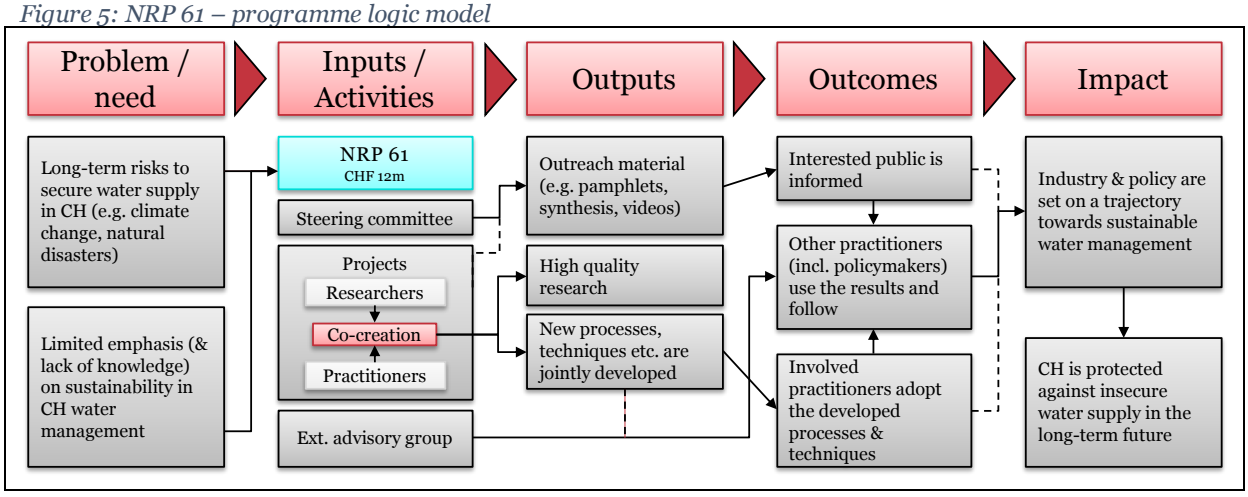
[46] Rist, S.; Schneider, F.; Buser, T. (2015), NFP 61 Spezialsynthese Transdisziplinarität - Potenziale und Limitationen transdisziplinärer Wissensproduktion in Forschungsprojekten des NFP 61, Final Report, Bern.

improved with respect to transdisciplinary research, guided by the NRP's KT manager. However, this improvement could not be observed for all projects.

4.6 NRP 61 – assessment of strengths and weaknesses

The logic chain of NRP 61 can be mapped, and its most noteworthy element is the factor of co-creation. Unlike in NRPs 59 and 60, stakeholders from the practical field do not merely come into play beyond the stage of 'outputs', but are integrated within the programme's research activities. The intention here is to ensure that practice-oriented and relevant work is undertaken, and that this core group of stakeholders is immediately able to transfer the work into practice. At the same time, the inclusion of an external political advisory group ensures that this stakeholder group accompanies and informs the work, and may be able to implement results in their sphere of influence too. In combination with the wider dissemination activities (synthesis, presentations, etc.), a three-pronged approach is created to facilitate wider impacts.

Figure 5: NRP 61 – programme logic model



NRP 61 can be judged as a success, both in terms of academic and non-academic achievements. However, it is worth reflecting on the KT concept, as it did ensure uptake of findings in practical domains by involving practitioners in the research process, but had its limitations nevertheless.

Against the background of the rather innovative and experimental nature of the KT concept of the NRP, it is not surprising that some problems and conflicts arose. The KT concept was still under development when the NRP commenced. PIs reported that the KT concept was only communicated to them during the course of their project, rather than at the start, meaning that it took some time before it was fully clarified and understood. More generally, for administrative aspects both at application stage and over the programme's duration, NRP 61 receives less favourable feedback from project leaders than NRPs 59 and 60, owing in large part to the lack of clarity with regard to the KT concept and how the co-creation aspect was to be facilitated.

As notes above, our interviews also indicate that the co-creating approach was not practiced equally across all projects: the degree to which stakeholders were integrated into the research differed significantly between the individual projects. There is a positive relationship between the early involvement of stakeholders in the research process and the impact in terms of research results that are useful for, and implementable by, practitioners.

On the other hand, there were individual projects that conducted high-quality basic research but did not produce results that could be implemented in practice, failing to meet the non-scientific targets of the NRP.

Some research teams applied for funding to finance basic research with very little attention to practical application. During the selection process, many applications were rejected by the steering committee

because of an insufficient KT concept and low potential for practical implementation. It was mentioned that the call for proposals was very broad. This resulted in a mix of projects that was not optimally coherent.

Given the novelty of this approach to KT, it is possible that these issues can be characterised as 'teething problems' – ensuring that selection criteria are clear and un-ambiguous and the co-creation approach fully articulated and communicated to all applicants and project leaders may mitigate such problems in future NRPs that take this approach.

While there are successes and impacts to report among the practitioners who participated directly in the NRP (either in the projects or via the advisory group), there is little evidence of impacts among stakeholders in the wider field. The wider outreach activities (synthesis, videos, etc.), as well as the 'good example' presented by programme participants may in the future lead to wider uptake and development of solutions. However, according to individual interviewees a higher non-academic impact could have been reached if the process of implementation had been institutionalised after the termination of the NRP, for instance by establishing a regular working group where researchers and stakeholders from politics and industry had met regularly for two or three years after the termination of the NRP with the intention to reach final implementation of selected research results.

5 Comparative analysis

In the main NRP-specific chapters we have focused largely on the outputs and impacts of each NRP, as well as on their original purpose and context; firstly, because these are the central elements that this impact evaluation sought to address, and secondly because these areas – aim definition and impact optimisation – are the ones where most critical engagement is necessary. In this section, we draw together our findings to give a comparative perspective across the three NRPs (and beyond) to highlight commonalities and differences, strengths and problems. We structure our findings along a generic programme logic (context/aims – inputs/activities – outputs – outcomes – impacts).

5.1 Context and aims

5.1.1 Programme archetypes

The overall headline intention of the NRP instrument is to fund research that contributes to the solutions of pressing practical problems in Switzerland. However, this intention is realised in very different ways in the three NRPs evaluated here. We identify several different NRP 'archetypes' in terms of how NRPs position themselves in relation their topic of interest. We conducted a brief analysis of all concluded NRPs from NRP 50 onwards (see Appendix B for full analysis) and identified five different archetypes, that we have grouped into two categories, conflict models and development models:

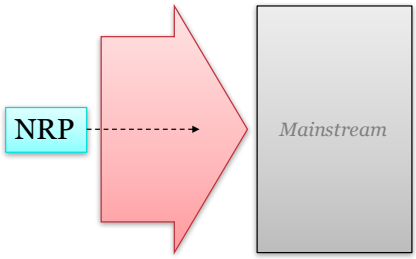
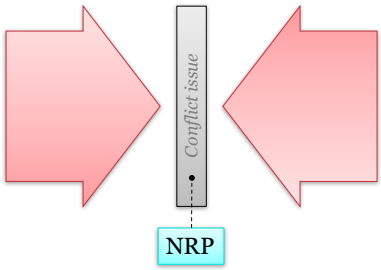
- **Conflict model 1 – 'Advocacy':** To develop practice-oriented research findings that can support particular groups in society whose equality, dignity or inclusion is insufficiently safeguarded by aspects of mainstream society
- **Conflict model 2 – 'Decision support':** To provide a neutral evidence base to support and improve the quality of debates on unresolved issues, effectively aiding all involved decision makers
- **Development model 1: 'Acceleration':** To move Swiss research forward in a field where particular opportunities are deemed to exist, either to foster and expand a leading position for Switzerland or to ensure 'catch-up' in cases where this is necessary
- **Development model 2: 'Steering':** To set a particular practical field on a positive, sustainable path of development and to avoid potential risks or hazardous scenarios that may occur if no intervention takes place
- **Development model 3: 'Orientation':** To explore an important new area of science, technology or social development and conduct an open-ended assessment of it. Novelty and consequent lack of understanding mean that focus on risks and opportunities is equally possible

The archetype of an NRP is not determined by its subject matter (see Appendix B). Rather, those involved in creating the programme also create a self-understanding (Programmselbstverständnis) through describing the problems to be addressed and how exactly the programme positions itself in relation to them. Each of the three NRPs evaluated here falls into a different archetype, which in turn has implications for their respective KT concepts, orientation, and pathways to impact:

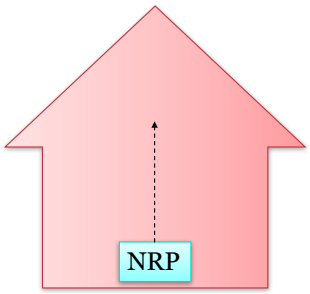
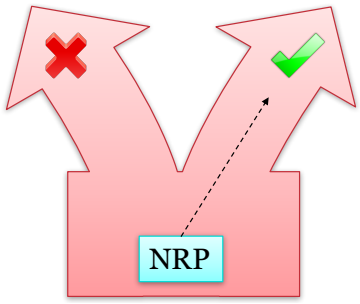
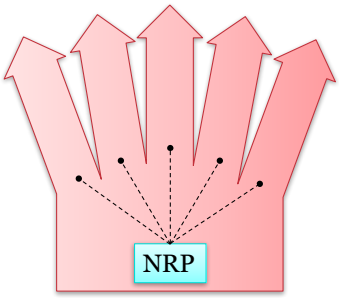
- **NRP 59 – decision support:** although NRP 59 addresses the question of risks and benefits of GM crops in a broad and multidisciplinary manner, its motivation stems from one very specific issue: the Swiss debate on GM crops and the moratorium. The expected outcome was to provide input (and, by some stakeholders' anticipation, concrete solutions) to this singular political issue: whether to extend, modify or end the moratorium, and under what conditions
- **NRP 60 – advocacy:** NRP 60 aimed to generate an understanding of how gender inequalities are affected by several factors over a person's life, how many different fields of policy and practice interrelate to shape these inequalities and how these cross-sectoral challenges might be addressed. This required spreading key ideas and findings as widely as possible and helping to establish gender-aware practices across the spectrum of mainstream politics, policy and practice
- **NRP 61 – steering:** water supply is not an issue that is causing significant problems in Switzerland at present. NRP 61 does not therefore address a current problem, but aims to prevent future problems, thereby focussing on sustainability. It sought to move a sector of policy, society and industry on a long-term developmental path to avoid or minimise problems, which, for the most part, have not occurred yet

Figure 6: A typology of NRPs

Conflict models

Advocacy	Decision support
	
Position: Support one side (or several 'allied' sides). The 'Mainstream' might not be a clearly defined or vocal adversary	**Position: Act as an arbiter between two (or more) identifiable sides in a debate or conflict**
• NFP 51 "Integration und Ausschluss" • NFP 58 "Religionsgemeinschaften, Staat und Gesellschaft" • NFP 60 "Gleichstellung der Geschlechter" • NFP 67 "Lebensende"	• NFP 59 "Nutzen und Risiken der Freisetzung gentechnisch veränderter Pflanzen"

Development models

Acceleration	Steering	Orientation
		
Trajectory: Positive; must be supported	**Trajectory: Potentially hazardous; must be changed/ steered**	**Trajectory: Unclear; must be explored**
• NFP 53 "Muskuloskelettale Gesundheit – Chronische Schmerzen" • NFP 62 "Intelligente Materialien" • NFP 63 "Stammzellen und regenerative Medizin" • NFP 66 "Ressource Holz"	• NFP 50 "Hormonaktive Stoffe: Bedeutung für Menschen, Tiere und Ökosysteme" • NFP 54 "Nachhaltige Siedlungs- und Infrastrukturentwicklung" • NFP 56 "Sprachenvielfalt und Sprachkompetenz in der Schweiz" • NFP 61 "Nachhaltige Wassernutzung"	• NFP 52 "Kindheit, Jugend und Generationenbeziehungen im gesellschaftlichen Wandel" • NFP 57 "Nichtionisierende Strahlung – Umwelt und Gesundheit" • NFP 64 "Chancen und Risiken von Nanomaterialien" • NFP 65 "Neue urbane Qualität"

For full details see Appendix B

An NRP may in theory approximate to more than one archetype, though we note that the great majority could be classified un-problematically. The existence of these different archetypes shows that the headline intention and 'Gestalt' of NRPs can take radically different forms. It demonstrates that the NRP instrument as a whole is flexible in terms of the range of different programmes it can facilitate and the different ways in which a topic can be addressed. This variety also has implications for any NRP's further progress, from aim-setting to implementation, composition, KT strategy, stakeholder involvement, likely problems and anticipated impacts.

5.1.2 Aims and success criteria

Each NRP evaluated here has a set of intermediate aims that are clearly identifiable at the outset. In all cases, these pertain to creating an evidence base, developing a better understanding of the topic in question, developing practice based approaches or solutions and presenting/communicating these to stakeholders. Though they differ depending on context, they follow a common formula. However, each NRP also has more directly socially, politically or economically relevant aims:

- Primary aim of NRP 59: to inform and improve the debate and decision-making on GM crops
- Primary aim of NRP 60: to achieve greater gender equality
- Primary aim of NRP 61: to improve the sustainability of the water supply

Our survey results show that the aims were communicated clearly to the researchers, although more so in NRPs 59 and 60 than in NRP 61, where clarity of purpose was problematic at the start. However, these aims, both primary and intermediate, lead to the question of how success will be measured. In this respect we find a serious shortcoming with all three NRPs, in that impact indicators are insufficiently specified. For NRP 59, there is no evidence of any markers of 'success' or 'failure' being defined at the start. For the other two, early programme documentation posits some questions or success criteria, but these do not lend themselves to ex-post evaluation, as they are too un-specific and lack inclusion of either qualitative or quantitative indicators.

Our stakeholder consultations for this study show that this caused particular difficulties for NRP 59: the programme was not intended to provide a recommendation as such on the future of the Swiss GM moratorium (i.e. a yes/no answer). However, the intention to inform a debate implies that the debate should in some form be influenced. As shown, the level of influence on the debate was a lot smaller than those involved in the programme had hoped. However, it is unclear how much influence, or what kind of influence, was intended and how it could therefore retrospectively be assessed whether the observed level of influence constitutes success.

Likewise, our evaluation shows that NRPs 60 and 61 were successful at sharing results with closely involved or immediately interested practitioners (gender bureaus and similar organisations for NRP 60, project-internal practitioners and the political advisory group for NRP 61) and achieved impacts among these groups, but both struggled to widen the 'reach' of results beyond these circles. Once again, a lack of success criteria and indicators mean that it is unclear to what extent these limitations of impact are acceptable, or whether they constitute a failure.

As we detail below, elements of the programmes' KT strategies are in various ways problematic, and the overall non-academic impacts of the NRPs have been limited. One of the central findings of this study relates to this: with a clearer specification of success criteria and attached indicators – quite possibly qualitative rather than numerical ones – NRPs would be able to better map out KT strategies and determine exactly what they wish to accomplish; which, by proxy, also allows for better indication of how to do so.

5.2 Inputs and activities

Table 5: Input figures in contrast

	NRP 59	NRP 60	NRP 61
Total budget	CHF 12m*	CHF 8m	CHF 12m
Budget: Projects vs. KT and admin.	Projects: CHF 10.5m (87.5%) Other: CHF 1.5m (12.5%)	Projects: CHF 6.2m (77.5%) Other: CHF 1.8m (22.5%)	Projects: CHF 9.9m (82.5%) Other: CHF 2.1m (17.5%)
Clusters / modules	4 modules (incl. a synthesis module)	3 Modules	2 clusters (later abandoned)
No. of projects (excl. synthesis)	29	21	16
Proposal success rate	Outline to proposal: 42% Proposal to project: 81% Total success rate: 31%	Outline to proposal: 34% Proposal to project: 51% Total success rate: 18%	Outline to proposal: 27% Proposal to project: 89% Total success rate: 23%
Number of researchers (P3)	73	77	93

*Additional funds were later required, notably for security measures following vandalising of open field trials

The three NRPs are broadly similar in terms of size and structure. Though the overall budget of NRP 60 is considerably smaller than in the other two cases, the resulting number of projects and people involved remains on a similar scale. In part, this may owe to the fact that projects in social sciences tend more generally to be cheaper than in hard sciences requiring equipment and consumables. We have no evidence that this size and scale is problematic in any way.

The success rate for applications to all three programmes is low when compared to the SNSF's overall research project application success rate of around 50%. This indicates that competition is healthy and there was certainly demand from researchers to get involved in all three programmes. Additionally, many of our survey respondents noted that NRP participation is prestigious, underscoring further that NRPs are likely to attract many applications.

It should briefly be considered why NRP 60 spent a larger share of budget on aspects other than the projects themselves. It may be that there is an economy of scale here: administration of a programme of this size may simply have a minimum cost, regardless of exactly how many projects are funded or of the programme's total budget. However, since the subject matter and aims of NRP 60 involved especially extensive dissemination activities (i.e. to many different groups and at project and programme level), more costs are incurred. Indeed, NRP 60 made available a 'pot' of money for project level KT activities, which does not appear to have been the case in the other programmes. NRP 59 by contrast had a well-defined main stakeholder group, where extensive outreach work was not required in the same way, lessening the need for extensive KT activities, which is at least one influence on the overall lower non-project spend. There are few grounds to criticise the expenditure figures; we simply note that different aims and contexts result in different KT expenditure needs.

Dividing NRPs into 2-5 modules or clusters appears to be a common approach. However, our study has found no evidence of the benefits of doing so. In fact, the division into two clusters was abandoned in NRP 61 because there was too much important overlap between them. Similarly, the division of NRP 60 into modules appears counter-productive, given the intention to understand the links and connections between different aspects of gender equality and equality policy. At the level of results dissemination and synthesis reporting, division into different areas of interest may be useful – as happened in NRP 61. But within the programmes themselves, it is unclear whether there is any benefit to this common form of segmentation, alongside a risk of fragmenting the research.

5.2.1 *Types of research – types of people*

Whilst the NRPs are broadly similar in terms of the numbers of people and projects involved, there are major qualitative differences at the more descriptive level in terms of the people and types of research involved.

Table 6: Characteristics of researchers and research types

	NRP 59	NRP 60	NRP 61
Baseline: CH research strength	Strong CH is in 10th position worldwide by publication volume on GM Plants. Reckenholz and ETHZ are internationally recognised centres	Weak Far less output or impact on Gender Equality than comparator countries. Field acknowledged as being under-developed in CH	Very strong CH is among the top-4 countries by citation impact in the water management field, top country in Europe
Prior related NRPs	No	Yes: NRP 35 "Social and Legal Status of Women - Ways to Equality", Further, NRPs 29, 43, 45 and 52 all included some element of gender	Yes: the topic was partly addressed by other NRPs in the past, in particular NRP 31 "Climate change and natural disasters" (completed in 1998)
Disciplinary mix	Broad Incl. botany, psychology, ecology, agriculture, legal sciences and many others (SNSF Div. 1-3 all represented)	Narrow Mostly sociology and economics; all disciplines are within SNSF Division 1	Medium Mostly hydrology & environmental science; some additional social science
Researchers' prior focus	Mostly basic research	Mostly use-inspired research	Mix of basic and applied research

Figure 7: Survey data – research type prior to NRP projects

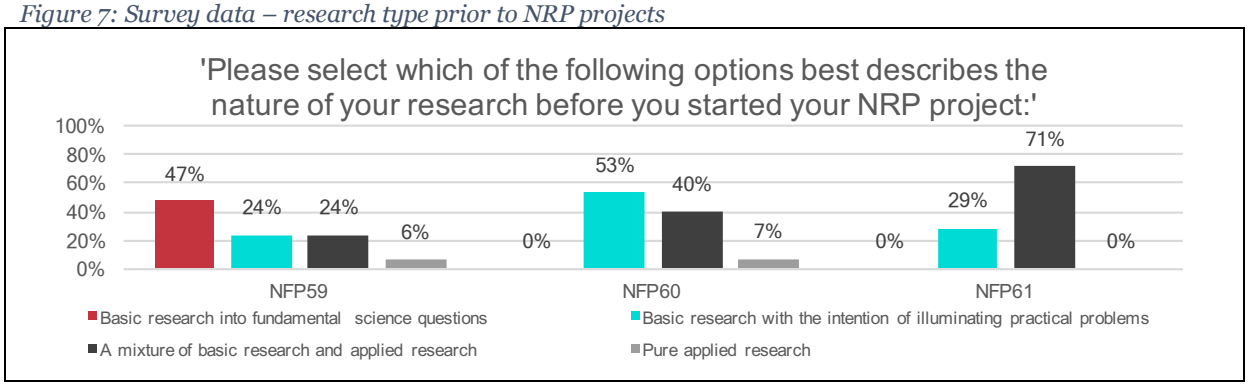


Table 7: institutional affiliation of Programme members

	Total People involved (P3 data)	% ETHZ/ EPFL	% University	% Other research institutes	*% ETH/ Univ./ RI*	% FH/PH	% Others (incl. gov't & private sector)
NRP 59	73	15%	42%	16%	*74%*	8%	18%
NRP 60	77	0%	57%	9%	*66%*	14%	19%
NRP 61	93	22%	26%	17%	*65%*	0%	35%

Source: analysis of P3 data

The observed differences reflect the different programme intentions and archetypes, and once again demonstrate the flexibility and breadth of the NRP instrument.

- NRP 59 positioned itself as a neutral, evidence-based source of decision support. It attempted to provide scientific results to resolve (or aid the resolution of) a politically polarised argument. An overtly 'scientific' perspective is consequently needed, which is evidenced by the dominance of basic science backgrounds and a comparatively high proportion of involved individuals from ETHZ, cantonal universities and other research institutes. At the same time, the nature of the issue demanded perspectives from biological science as well as ethics, law and other allied fields, yielding a broad disciplinary mix, though biological sciences dominate
- NRP 60 did not position itself in this neutral way. Instead, it sought to affect a range of organisations and practical fields, supporting greater gender equality in Switzerland. This intention somewhat reflects the notion of 'use-inspired' research, in that it does not merely present scientific facts for decision makers to consider, but seeks, with normative intent, to present knowledge capable of facilitating change. The subject-matter of NRP 60 is of a strongly social scientific nature, so the narrow disciplinary mix is to be expected
- NRP 61 is positioned more closely in the practical realm, with backgrounds in applied research being the norm, reflecting the intention to co-create research and new practices with practitioners

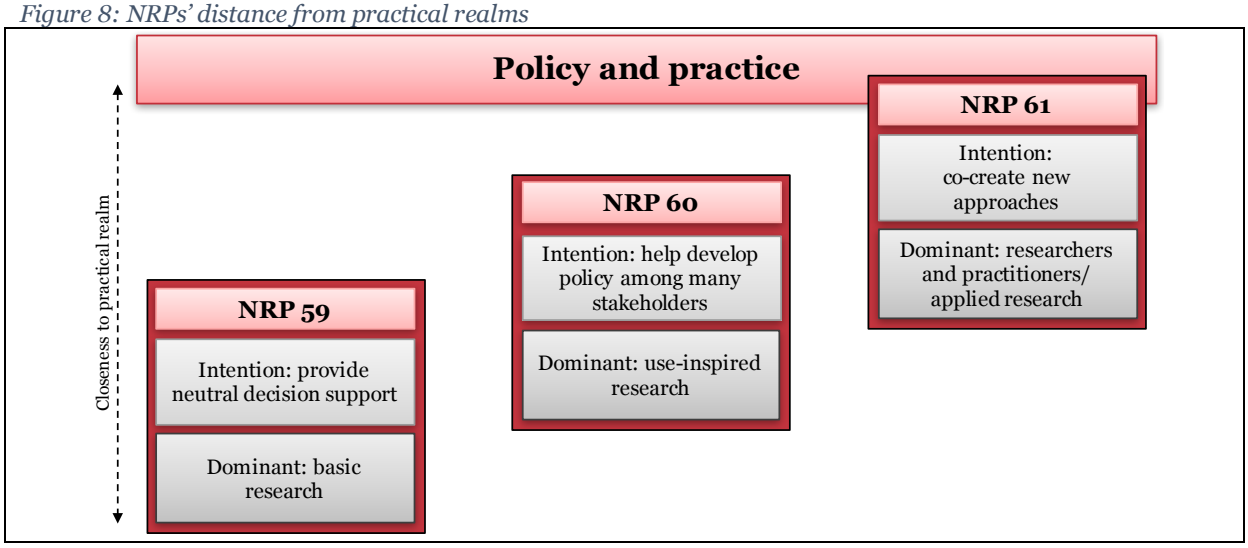
NRPs 59 and particularly 61 started out in the context of an already strong science base. To ensure scientific credibility in its decision support (NRP 59) or secure buy-in from practitioners (NRP 61), such internationally renowned scientific strength is an important factor. However, it is noteworthy that NRP 60 had a weak Swiss research base as its starting point, a factor which also affected its low yield of internationally recognised research outputs.

Whilst the NRP instrument intends to fund programmes that will not only address practical problems but also produce good science, the modest scientific starting point of NRP 60 should not be understood as a criticism: our research shows that the relative lack of gender research in Switzerland was precisely a source of difficulty for practitioners working in the field. The creation of an evidence base comparable to other western European countries was welcomed by many external stakeholders.

While the SNSF's feasibility studies ('Machbarkeitsstudien') for each NRP rightly assess whether there is a suitable scientific capacity for the NRP to be conducted, NRP 60 shows that a world-leading science base is not a necessary precondition. In this case, the absence of such a research strength provides part of the rationale for having a programme of this type. The feasibility study therefore correctly identified that the research base was strong enough to facilitate the 'boost' to be created by the NRP, but did not allow its low international standing to deem the topic unfit for an NRP. The capacity to fund NRPs in weaker fields of science must be identified as a strength of the NRP instrument – especially where such weakness in the research base is part of the problem for practitioners.

Finally, these figures on the people and research traditions involved in the three NRPs show that the three programmes have different levels of distance from the practical domains they seek to address. 'Distance' here refers both to the nature of the research, as well as to the people involved. It should not be inferred that this distance is necessarily a point of criticism. The dominance in NRP 59 of basic research and institutions that typically carry it out closely reflects the intention of providing a neutral, science-based standpoint, whilst NRP 61 by definition has to involve practitioners directly in order to emphasise transdisciplinary co-creation, with NRP 60 occupying a middle-position.

Figure 8: NRPs' distance from practical realms



5.3 Activities

5.3.1 Communications and administration

Communications and administration receive positive feedback for the most part:

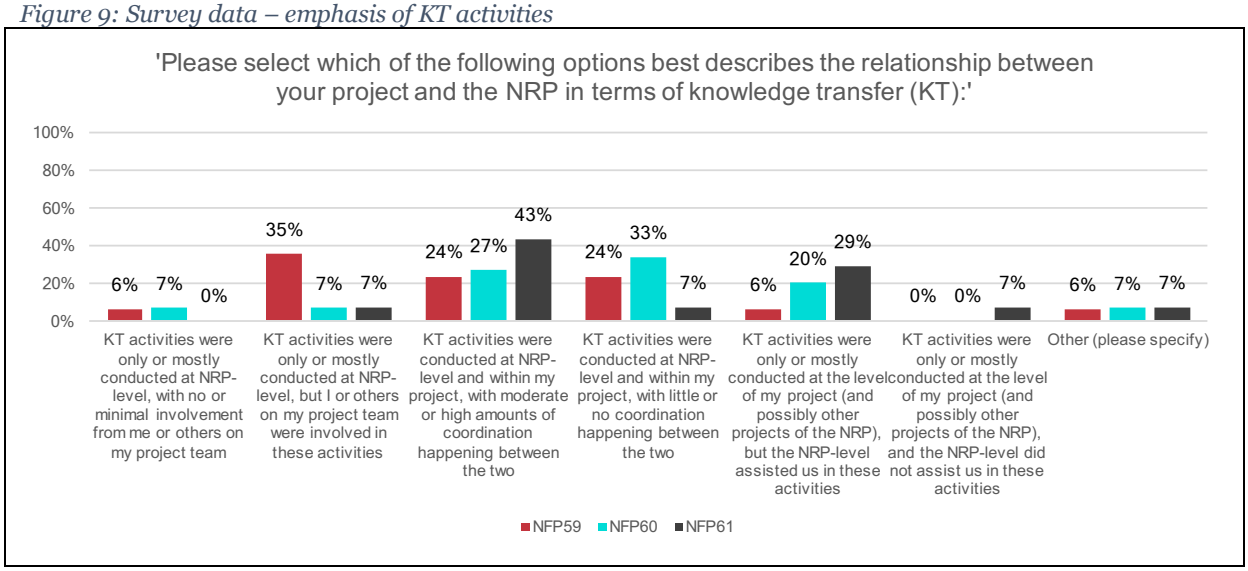
- Project leaders most often reported that communication with the programme level occurred either 1-4 times or 5-11 times a year, with a further small number reporting monthly contact
- Project leaders reported communication with other projects of the NRP slightly more frequently (most often 5-11 times per year) than with the programme level. In NRP 59, project-to-project communication was even more frequent in some cases, with several project leaders reporting communication with other projects on a monthly or even weekly basis
- These communication levels are judged to have been somewhat helpful to achieving scientific and non-scientific goals. We note that in NRP 59, the communication between projects is judged to have been especially helpful, which once again signals the success of the internal consensus-building element of this programme
- There are high levels of satisfaction with the extent of communication as well as other administrative aspects, both at the application stage and over the course of the programme. This includes support provided by the SNSF itself
- The only caveat to these positive findings is that there is more mixed feedback on NRP 61, specifically on clarity of the selection criteria for projects, on the quality of feedback to applicants, and on the communication of the KT concept. These less favourable findings reflect problems that were also highlighted by our stakeholder interviews, and underscore the difficulty of operationalising the novel approach to KT undertaken in this programme

5.3.2 Three KT concepts in context

Although synthesis reporting and a wide range of presentation events are characteristic of all three evaluated NRPs, their KT concepts differ significantly. In all three cases, the KT concepts are appropriate and reflect each programme's archetype – although appropriateness does not necessarily equal success.

Our survey of PIs highlights the different approaches. The KT in NRP 59 was largely led by the programme level. For NRPs 60 and 61, significant KT at both the programme and project levels is evident, as is communication and coordination between the two. For NRP 60, some individual projects undertook autonomous KT activities, which was also confirmed by our interviews, as well as by the fact that NRP 60 had a specific budget set aside for project-specific KT activities.

Figure 9: Survey data – emphasis of KT activities



The approach used in NRP 59, where the programme level synthesised project findings and took a clear and visible lead as a main contact point matches well to its archetype ('decision support'): the focus was on a singular political decision, which allowed for clear identification of key stakeholders, who were additionally very aware of the NRP's existence (and in fact were explicitly awaiting its results).

A similar level of congruence exists for NRP 60: the direction of knowledge transfer was more variable, in the sense that many different policy areas were targeted. The programme level accomplished this to an extent, through its synthesis efforts and an impressive number of meetings and presentations. However, not all the programme's findings would have been relevant to all external stakeholders, so individual projects assume a much more important role: a project on teaching and learning approaches in schools is unlikely to be of interest to stakeholders looking to consider gender inequality in pensions. As such, there was an evident need for various projects to conduct topic-specific KT activities. More generally, tackling gender inequality across a range of domains presupposes widespread presence and activity, rather than interaction with a small and connected group of stakeholders.

NRP 61 differs somewhat from the other two NRPs in terms of its KT concept: the notion of co-creation and transdisciplinarity is far more pronounced. Rather than purely 'reaching out' to stakeholders in practical domains (though this also occurred), the KT concept rests on inclusion of practitioners in the design and process of the research itself. The process of 'steering' an entire sector onto a sustainable trajectory of future development would benefit from collaborating with members of that sector, rather than simply transferring pre-created knowledge to them.

Given the success of the co-creating approach to KT in NRP 61, inasmuch as results were implemented at least by participating practitioners, it is worth asking whether this approach ought to be used in all NRPs. However, our research suggests that this may not always be beneficial in all cases:

- Our evaluation of NRP 60 showed that there was considerable interest and 'buy-in' from those practitioners who were already working on gender equality. 'Reaching' these groups was never a problem and many were keen to receive the results and try to include them in their work. The problems with knowledge transfer and achieving practical changes occurred further downstream, among stakeholders not immediately interested in gender equality, who would have been extremely unlikely to involve themselves within a co-creating programme in the first place
- NRP 59 positioned itself in a neutral way between conflicting sides, and our findings show that maintaining this neutrality was seen as critical to be able to maintain an authoritative position within the debate on GM crops. Co-creation with practitioners therefore would have risked diluting this position

5.4 Outputs

Productivity of the programmes is the part of the logic chain where we can note the least concern. All three programmes produced large volumes of written academic and non-academic outputs, as well as large amounts of further outputs such as talks, workshops, pamphlets and videos. We conducted a small comparative analysis, contrasting levels of academic output from the three NRPs with output levels from mainstream SNSF grants, which shows that output levels are almost identical (see section D.1 of Appendix D). This is especially impressive, given the additional 'mission' of NRP research to directly address non-academic problems. Despite this dual mission, academic productivity is not compromised.

5.5 Outcomes and impacts

Following on from the impressive levels of productivity in all three programmes, the immediate programme outcomes are likewise not a source of concern. This is especially true at the academic level: appropriately large bodies of work were created, early career researchers trained. NRP 59 set some benchmarks regarding field trials, which will ease such processes in the future. NRP 60 ensured a level of scientific visibility that contributed to an expanded research base not only at the early career stage, but also in terms of new professorships in the field of gender. Likewise at the non-academic level, synthesis material in all cases produced the impulses, guidance and overviews that were planned from the programme outset.

However, all three programmes faced difficulty when it came to translating the immediate outcomes of the research and dissemination and outreach activities into wider impacts in their respective fields of investigation. Project leaders, programme level individuals and wider stakeholders alike often noted that the final impacts of the programmes had been moderate, or fell short in at least some areas.

Our analysis shows that the KT concepts of the three programmes were appropriate for the context. But this did not mean that the concepts were fully successful, or that they could not have been developed further in order to ensure greater impacts. We can summarise briefly:

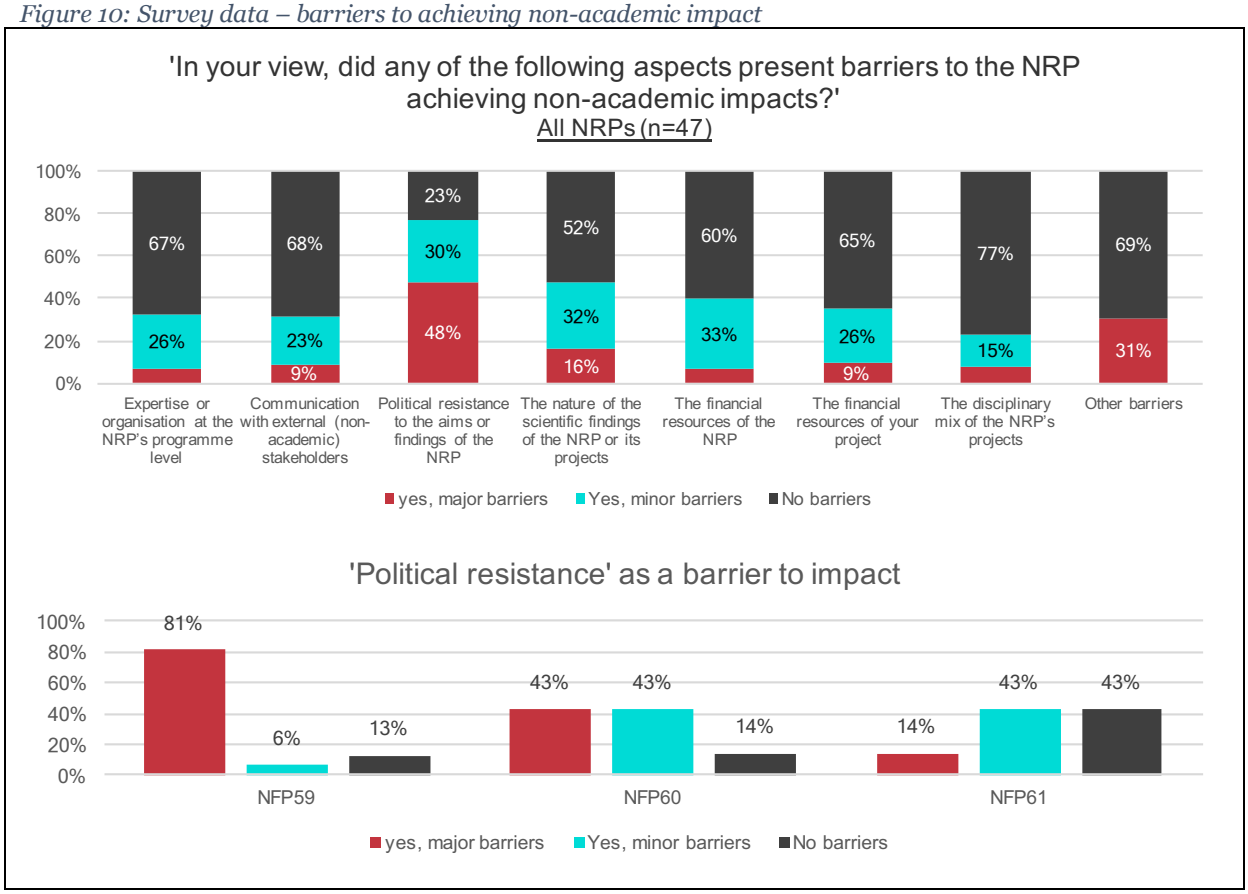
- NRP 59 presented a neutral evidence base to a clearly defined group of stakeholders involved in the decision of GM crops. However, whilst the evidence was clearly and un-problematically received, it failed to significantly shape the debate on GM crops in Switzerland
- NRP 60 successfully disseminated its findings to a wide range of stakeholders already interested in the topic of gender equality. To the extent that these individuals and organisation had the capability to implement the findings (or 'impulses'), there are many instances where this was indeed done. However, only rarely did these act as 'multipliers' who could push the findings and consequent policy needs into other decision-making circles
- NRP 61 sought to ensure non-academic impact within the projects themselves. In those projects that did facilitate such co-creating approach (not all projects did this!), the envisaged pathway to impact was successful. However, there is little evidence so far that these closely facilitated impacts (or other outreach activities) had any effect on more distant stakeholders

There are no evident failures in terms of productivity or administration. However, there is a lack of consideration of barriers to impact at the programme design stage, as well as a lack of specificity about what exactly would have constituted 'success' for each NRP. Addressing these two issues would almost certainly have allowed for a more aware and targeted KT strategy and impact pathways for all three NRPs. This is the most critical aspect of our comparative evaluation and we turn back to it in the concluding section of this chapter.

5.5.1 When science meets politics: barriers to impact

By an extremely wide margin, project PIs rated 'Political resistance to the aims or findings of the NRP' as the most frequent and most severe barrier. This applies especially to NRPs 59 and 60, but far less so to NRP 61 (for which political resistance is generally only a minor concern).

Figure 10: Survey data – barriers to achieving non-academic impact



In terms of NRPs' ability to achieve their intended non-academic impacts, this is an important finding. It ultimately relates not only to NRPs, but more broadly to the question of how – or under what conditions – science is able to have an impact on the political or policy world and beyond. It is not a problem in all cases: the relative absence of political resistance perceived in NRP 61, combined with the more co-creational KT concept, coincides with far greater perception of satisfactory non-academic impact. Yet, it would be regrettable if the presence of political resistance were to discourage future NRPs on particular topics – this would limit the scope and relevance of the instrument. Further, it should be remembered that NRPs 59 and 60 did have some successes. The question is, whether political resistance can be anticipated and planned for. In other words, whether there are considerations that can be made at the programme design stage that might better equip the programme to overcome, or at least partially counteract, foreseeable resistance, and thus lead to greater impacts.

It is also worth noting that the shape of political resistance differed between NRPs 59 and 60:

- NRP 59 set out to provide an evidence base to support a decision on Swiss GM policy, explicitly from a neutral standpoint that would consider all the various dimensions of this issue (including in disciplinary terms). However, the political context was of a severely polarised nature, divided, in simple terms, into distinctly pro-GM and anti-GM interest groups. The repeated vandalising of open field trials and consequent need for extra security is perhaps the clearest symptom of the extent of political tension. In this context, a 'neutral' standpoint struggled to obtain an influential place in the debate, and while the moratorium was explicitly extended to await the results of NRP 59, there is a strong sense that its findings did not substantially influence subsequent decisions on the matter. Providing decision-support in a polarised environment presented a challenge that could not be fully overcome
- PIs from NRP 60 note a high level of political resistance, but the explanation for this lies not in the presence of a conflict situation of the type encountered by NRP 59, but rather from limited interest in the NRP's findings from some stakeholder groups. Rather than a conflict scenario, the political

resistance reported for NRP 60 owes more to the fact that it failed to penetrate into areas where the issue of gender equality has so far not featured

Many stakeholders noted the various forms of resistance. Additionally, there are some signs that individuals involved in the programme creation and steering committees were aware of these potential hazards at the start. However, we find no evidence of consideration of how these problems might be addressed. An exception to this is the internal consensus-building in NRP 59. Here, it was acknowledged that political tension on the issue of GM crops also affects the research community itself, and an appropriate solution was found in the shape of extensive internal discussion, before outward-facing communication was to take place. Beyond this, there is evidence of concern that even a well-presented neutral evidence base would not be able to affect the political decision-making process. Likewise, individuals involved in NRP 60 were aware that many sectors of society, economy, policy and practice would not readily show interest in matters relating to gender equality. Yet, these concerns do not appear to have been subject to discussion or integration into programme design.

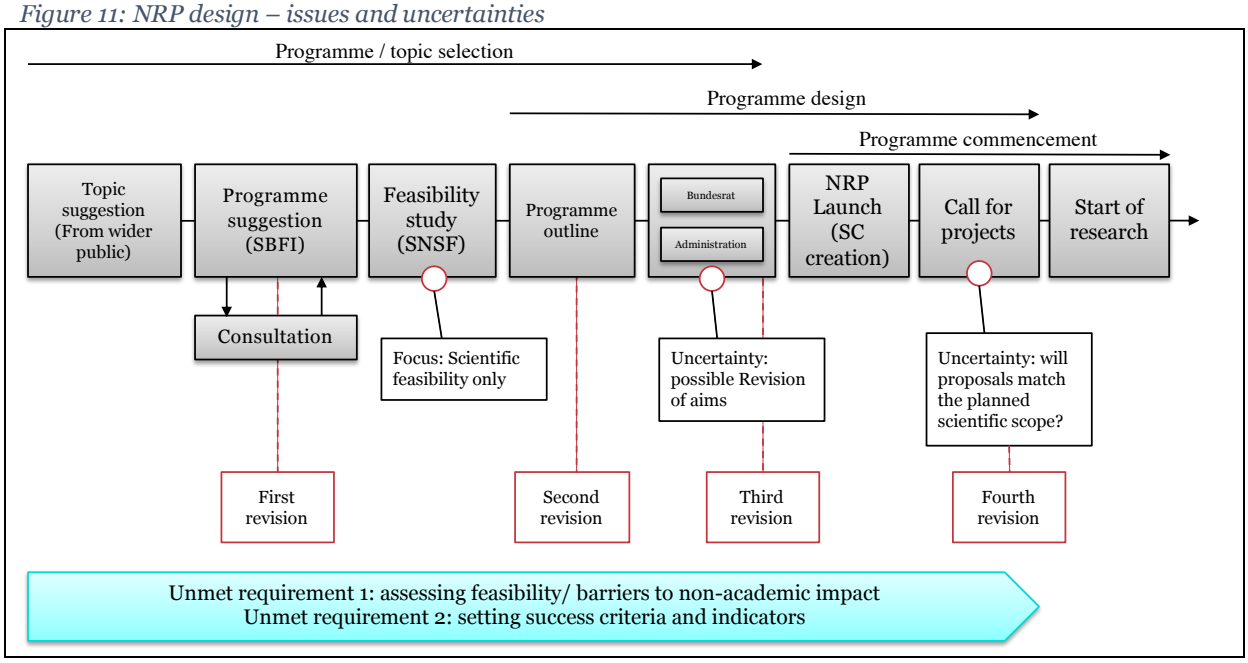
5.6 A note on programme creation

We return in the concluding section of this report to the issue of mapping logic and setting impact criteria and indicators prior to the programme start. In this context, it is worth briefly reflecting on the issue of NRP creation – although it lies partially outside the scope of this study – as these additional steps would likely need to be integrated here.

Our interviews highlighted that the process from initial topic suggestion to the start of the research involves many steps (which have been changed a few times). As different organisations provide input, the scope and aims of an NRP are subject to revision at several points, which also means that topic selection, programme design and programme commencement overlap, rather than being fully discreet steps.

Shortening or simplifying the process of NRP creation was acknowledged by many interviewees as an important need, though maintaining the input from different parts of the administration is also critical. Considerations around programme logic and indicator-setting should therefore not be understood as yet an additional step, but ought to be integrated in the steps that already exist.

Figure 11: NRP design – issues and uncertainties



6 Conclusion

Our evaluation has shown that the NRP instrument is fundamentally in good health. All three programmes evaluated here had high levels of academic and non-academic productivity, and a strong focus on producing relevant science as well as conducting extensive outreach and stakeholder communication activities. The administration of programmes is working well both at project application stage and during the programme itself, and the communication between the programme and project levels is likewise suitable and effective.

It is also evident that the NRP instrument has a high level of flexibility in terms of the different types of programmes it funds. Though the three NRPs are comparable in terms of size and basic structure, they take fundamentally different approaches in terms of how they position themselves in relation to their subject matter. From providing a neutral evidence base rooted in fundamental science (NRP 59), to helping optimise policy to achieve greater gender equality (NRP 60), to co-creating sustainable solutions with members of the water supply and management sector, steering away from future disaster scenarios (NRP 61), different programmes have different requirements. Here too, the NRP instrument is permissive enough to offer the flexibility in terms of different KT strategies, different types of researchers and research, and different divisions of labour between programme and project levels. The contrast between NRPs 60 and 61 additionally shows that different 'baseline' levels of scientific strength can equally provide good grounds for an NRP, Switzerland being an international scientific leader in the topic of the former, but having an under-developed science base for the latter.

There are some minor issues – some specific to various programmes, some more general, which we address briefly in our recommendation list at the end of this section. However, all three programmes share, to varying degrees and in different ways, a fundamental problem: whilst all are well executed and are clearly populated by productive individuals and research teams and engage in a lot of suitable dissemination work, all ultimately fell somewhat short in terms of achieving broad and lasting non-academic impacts. While some impacts can be pointed out for all three (especially for NRPs 60 and 61), the extent to which these programmes were able to bring about wide-ranging and nationally significant change is at worst low and at best unclear. We cannot identify failings on the part of the participating researchers or steering committee during the course of the programmes. Instead, the 'less than hoped for' impacts are attributable to two main factors:

1. The lack of setting specific criteria for programme success, along with indicators (qualitative or quantitative, as appropriate) that enable not only ex-post evaluation to judge success, but also to target KT strategies, stakeholder identification and tailoring of findings and dissemination materials in a more purposeful way

2. The lack of feasibility assessments and appraisal of barriers to non-academic impact at the start of a programme, from which strategies for overcoming such barriers may be constructed

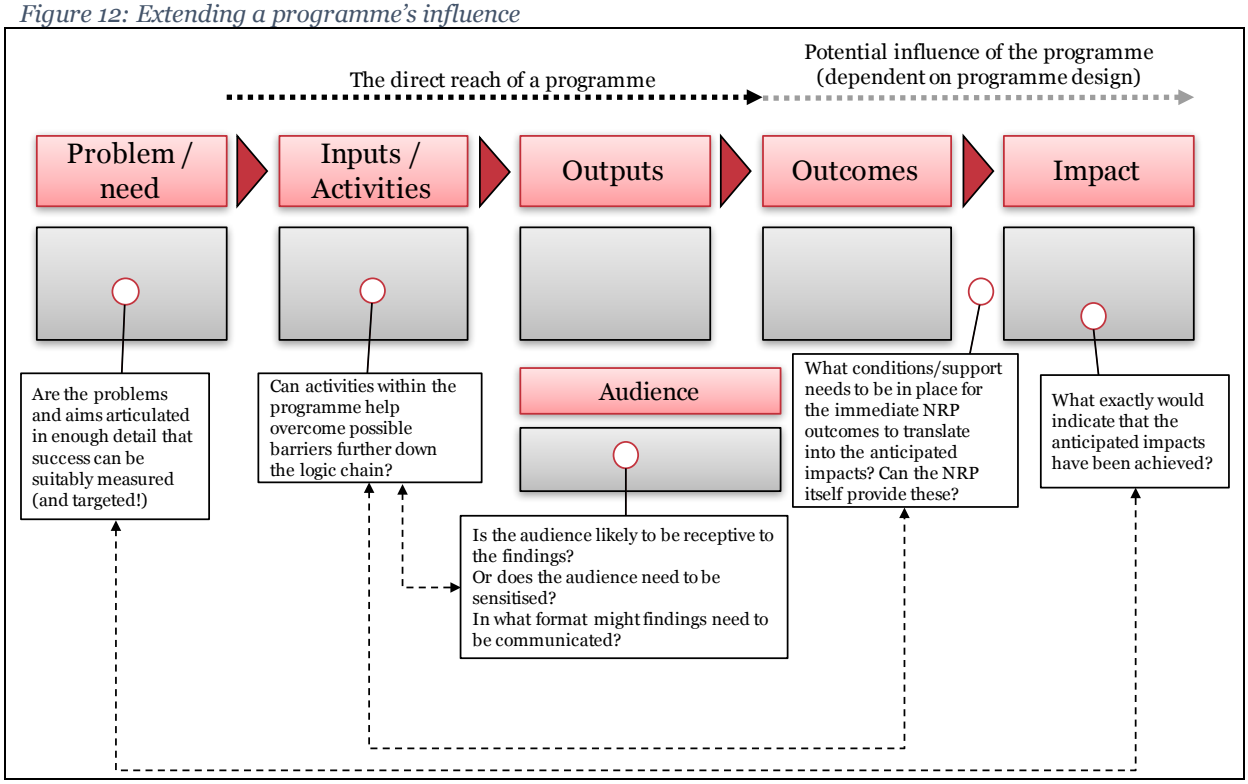
6.1 Mapping pathways, assessing barriers, optimising programme design

In every NRP, there is direct control over inputs, activities and outputs. steering committee, researchers or the SNSF can influence in a direct way what goes on up to this point of the logic chain. Once results are shared with wider stakeholders, and processes of social and economic change begin, this direct control inevitably disappears, as the programmes' effects cross over into the wider world. However, at these later stages of a programme's logic, we can still speak of influence. The critical task NRPs face is to maximise that influence, beyond the administrative reach of the programme, and to design the programme accordingly. Critical questions that need to be asked at programme design stage are:

- What do we intend to achieve?
- How will we know we have achieved it?
- What conditions are necessary to achieve it?
- Can we put those conditions in place?

Below we outline in some more detail, how these questions apply to the design of a programme logic model. Asking these questions at the start of a programme can highlight potential difficulties of the kind encountered by all three NRPs evaluated here, and thus, optimise programme design to counter them.

Figure 12: Extending a programme's influence



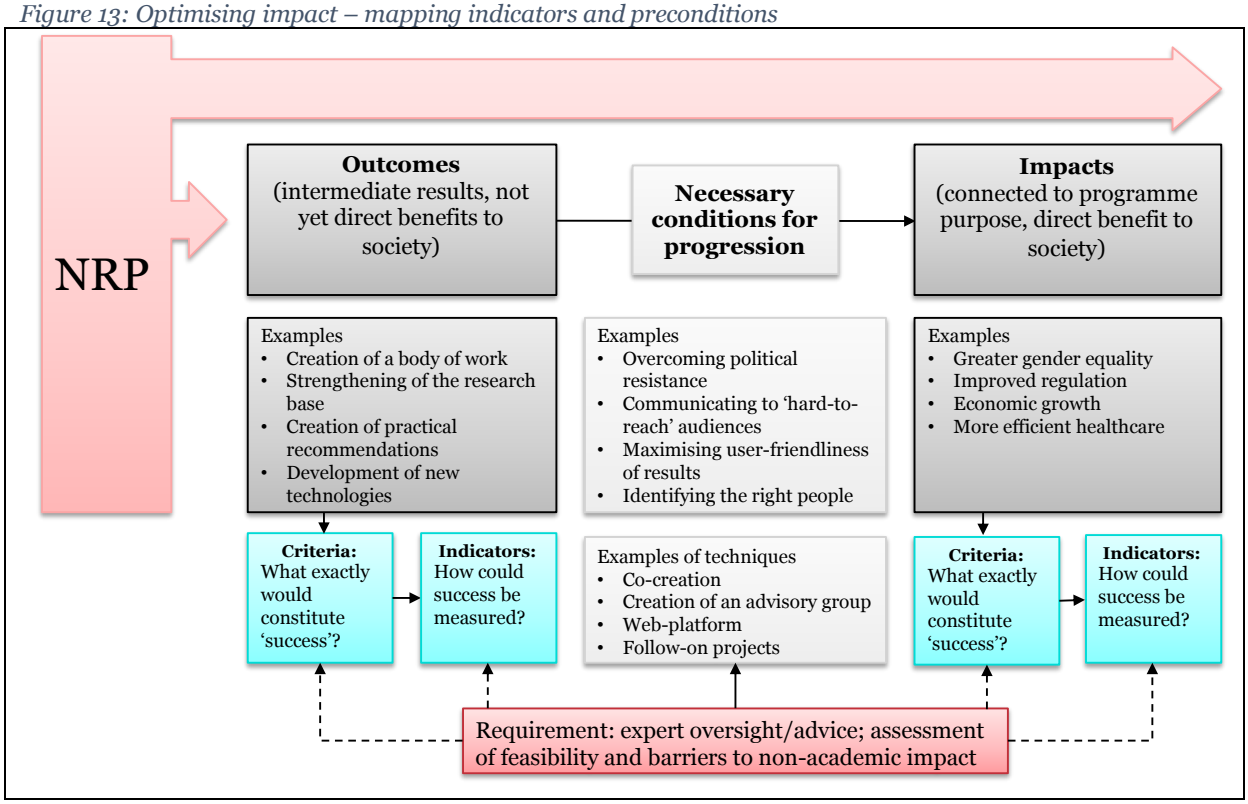
Particularly significant here is the transition through the final stages of the programme logic, as this is where the NRPs generally fell short. Our findings indicate that little consideration was given (in all three NRPs) to the transition from outcomes – the immediate results and effects of the NRP – to socially relevant impacts relating back to the original aims of the NRP. For example, it is clear that the political resistance or disinterest encountered by NRPs 59 and 60 was expected by many people involved, but little was done to consider these potential barriers to impact and contemplate ways in which the programmes might be better equipped to overcome or at least lessen such barriers.

It is notable that the creation of each NRP involves an assessment of scientific feasibility, as well as a lot of practical stakeholder input (with the SBFI) around the desirability of an NRP topic and consequent aim-setting. However, there is no formal stage of NRP creation where the feasibility of an NRPs non-academic ambitions is scrutinised. Conducting such an assessment presents a challenge in the absence of specific success measures. In other words, if it is not specified, what exactly an NRP intends to accomplish in terms of final observable and verifiable changes, it is difficult to assess whether there are any factors that might prevent these end-results from being achieved.

As such, it is important that the design stage of NRPs involves setting success criteria and indicators for intended outcomes and impacts, followed by an inquiry into whether they are achievable, whether there are any foreseeable barriers or problems, and whether any considerations can be made in the programme design to address these.

We understand that the process of NRP creation is already complex. A 'light-touch' approach to ensuring this might therefore simply be to include a logic-mapping exercise at the programme outline stage, and to have a non-academic feasibility assessment within the SNSF's feasibility studies, or in the SBFI's consultations. We provide an outline of the necessary considerations to be made prior to the programme start in Figure 13.

Figure 13: Optimising impact – mapping indicators and preconditions



6.2 Reflections on past evaluation

The NRP instrument was last comprehensively evaluated in 2007 by CEST.[47] The study found that NRPs generally produce high quality scientific work and conducted significant amounts of non-academic outreach and KT activities, but that the extent of non-academic impact of NRPs is somewhat variable, and noted two main points for future optimisation: firstly, a lack of systematic monitoring, documentation and reporting (especially final reporting) capable of demonstrating any achieved impacts. Secondly, insufficiently specific definition of aims.

A decade later, we find that CEST's headline findings largely still apply. It is evident that the three NRPs evaluated here are scientifically sophisticated, well organised and characterised by high productivity. However, we can expand decisively on the two headline points of criticism.

The monitoring and reporting of NRPs is extensive and detailed. The available documentation on each programme has ensured that the programme activities and results are made clear. The final reporting includes much information on who has made use of the programmes' findings and details specific instances of concrete impact where these have occurred. Additionally, the research information system P3 now provides an important dataset to conduct bibliometric analysis and other baseline data about programme composition, which is important for any evaluative purpose. In this sense, lacking documentation can no longer be recognised as a shortcoming of the NRP instrument. However, it should be noted that documentation and monitoring abruptly cuts off with the end of the NRP itself. Longer-term impacts – even those occurring within months after the end of the NRP – are therefore not captured by these activities.

CEST's point of criticism on aim-setting is still apt in the sense that aim-setting is not supplemented by specific markers of success and ways to measure whether they have been achieved. The three NRPs all specify a set of aims, and these are well understood by participating researchers. However, these tend to

[47] SBF: Wirkungsprüfung: Nationale Forschungsprogramme. Studie geführt von CEST. Staatssekretariat für Bildung und Forschung: Bern 2007.

be outcome aims rather than impact aims, which remain less well-defined. The headline aims of NRP 60 provide a case-in point:

- Highlight successes and failures of Swiss actions and programmes on gender equality
- Identify the complex causes for the persistence of gender equalities in Switzerland
- Create and make available a base of knowledge and recommendations for sustainable gender equality policy and practice

These aims relate to the anticipated outcomes of the work. What is missing is a clear statement of aims relating to the impacts that the analytical results are supposed to bring about. Only in this way can it be possible to contemplate how the transition from outcomes to impacts can best be facilitated. Similar criticisms apply for NRPs 59 and 61 as well.

As such, we conclude that the some of CEST's headline findings still apply, although there has clearly been progress in terms of monitoring. In this report, we put forward an approach to overcoming the remaining critical weakness of NRPs – the lack of specific impact aims and ways to assess them, combined with a lack of engagement with potential barriers in the impact-chain, leading to limited non-academic impact of NRPs.

6.3 Recommendations

Our recommendations relate of course not directly to the three NRPs evaluated here, as these have been completed and can no longer benefit from suggestions for optimisation. Instead, we focus on recommendations that focus either on the NRP instrument as a whole, or on specific types of future NRPs, some of which may be similar to NRPs 59, 60 or 61. In such cases, we use our typology of NRP archetypes (see Appendix B).

- Our headline recommendation is that future NRPs would benefit from a clearer statement of the intended outcomes and impact prior to the programme start, along with success criteria and possible indicators for each criterion. We stress that these need not be quantitative – they simply need to be verifiable
- Subsequently, future NRPs would benefit from a feasibility assessment of non-academic aims. This should involve input from non-academic stakeholders knowledgeable in the relevant fields and practical domains. The goal of this step is to assess
  - Whether the aims and anticipated impacts are realistic
  - Whether there are any foreseeable barriers to achieving the impacts
  - Whether any elements should be added or modified in the programme design to better address these barriers, or
  - Whether, given social, political or economic reality, the programme aims and intended impacts need to be revised

  Both could be undertaken as part of the existing process of NRP decision and creation. Ideally, it could be structured around the logic-modelling used in this report, where aims, inputs, activities, outputs, outcomes and impacts, and the necessary conditions and potential problems in the transition between the final steps are scrutinised. This approach will clarify each NRP's purpose to the greatest extent possible, optimise the KT strategy and the scope for achieving impact, and aid evaluative efforts after the NRP's end. We stress, however, that an NRP's logic model need not be 'set in stone' from the start: in some cases, there may be good cause to update or amend parts of the intended logic chain, and this should certainly be permissible.

  Our typology of NRP archetypes can also aid this process, as each archetype is associated with particular potential problems, which may need particular scrutiny. Once an NRP's archetype becomes clear, the following are the main points of enquiry, based on our analysis:

  - **Advocacy**: Beyond immediate stakeholders and 'multipliers', assess whether there are any links to decision-makers that could be strengthened from the programme start. Do either

researchers or the immediate stakeholders/multipliers have the ability to facilitate a progression from dissemination to impact?

- **Decision support**: Prior assessment of whether an independent science base is likely to be 'heard' in a politically charged environment. Can anything be done to ensure trust and 'buy-in' from all sides of the decision-making process?
- **Acceleration**: Is there any potential dilution of boundaries between the NRP instrument and other instruments (e.g. InnoSuisse/Bridge, early career researcher support programmes)? Is the NRP remit of addressing social, political or economic problems in a research-based way fulfilled?
- **Steering**: Where long-term impacts cannot be measured, how will markers of intermediate impact be defined? What might be signs that a positive 'trajectory' has been achieved? Co-creation or implementation of developed practices may be especially important here
- **Orientation**: How will the programme maintain its coherence with regard to stakeholders and anticipated impacts? It may be necessary to plan for incremental revisions of who the main stakeholders are and what kind of outputs, outcomes and impacts follow from the NRP's findings. Setting aside time and budget for such revisions might be necessary

- Despite its explicit aim to fund programmes that produce excellent research, our analysis shows that some NRPs have a relatively small or comparatively under-developed research base in the field of interest. NRP 60 is an example of this, as is NRP 63 ('Stem cells and regenerative medicine'). The flexibility of the NRP instrument to also fund programmes with a weaker Swiss research base is important: in the cases we have observed, the relative lack of research or researchers can be precisely part of the rationale for an NRP. Where the programme suggestion phase can make a good case for an NRP in a field of low Swiss research strength, the level of flexibility shown so far should be kept
- There is a tendency for NRPs to be divided into between two and five topical 'clusters' (sometimes also called 'modules'). We find no evidence that this structuring layer between the programme and project level has any merit. In NRP 61 this division was later abandoned, and in NRP 60 it was at odds with the central aim of integrating equality concerns between different policy and practice fields. Whilst topical separation might well be a sensible step at the programme synthesis stage, care should be taken in future not to include a layer of 'clusters' simply on the grounds that many past NRPs had such a structure. It may risk undermining synergies and unnecessarily fragmenting a programme. Division into such clusters should be possible of course, but only if it can be demonstrated to be beneficial for the programme and the research itself
- NRPs end very abruptly, including the dissolution of the steering committee. This means that there is no avenue for individuals involved in the NRP to further pursue possible impact pathways after this point. Some NRPs facilitate a funded platform for further communication and dissemination activities after the NRP (e.g. Wasser Agenda 21 in NRP 61), others have a pre-defined pathway for further funding (e.g. NRPs 62 and 66, through KTI/CTI), others again may not require such follow-on activity at all. However, it should be allowed to ring-fence a small amount of an NRP's budget for further meetings or dissemination activities after the formal end of an NRP (e.g. for occasional stakeholder meetings or conferences in the months or years after the NRP has ended) to ensure discussion and implementation of findings continues
- The co-creation model used in NRP 61 can be a useful pathway to impact, in that it ensures some non-academic stakeholders are directly involved in the knowledge production and can shape the research to suit their practical purposes. However, co-creation should not be seen as a universally preferable approach for all future NRPs. It fits well in the 'steering' archetype (NRP 61), but there were good reasons not to opt for this approach in the 'advocacy' model of NRP 60 or the 'decision support' model of NRP 59. For the 'steering', 'acceleration' and possibly 'orientation' models, co-creation may often be a useful approach. As this approach may be new to many researchers, it is important that this co-creating KT concept is communicated effectively. This was a challenge in NRP 61, so especially those individuals involved in the early stages of NRP 61 could usefully be called upon to share experience and provide guidance for future NRPs looking to take similar approaches

Appendix A Further analysis – Bibliometrics

A.1 Bibliometric analysis – NRP 59

- NRP 59 resulted in 153 confirmed publications, produced by 27 out of the 32 projects. However, data for NRP 59 are incomplete and we estimate the total number to be higher
- 70% of the confirmed outputs are articles, 21% books and book chapters, and the remaining 8% 'other'
- 268[48] authors were identified for the 153 publications. 45 of the 73 project leaders participating in NRP 59 are among these
- The average number of publications for the publishing NRP projects was 5.3
- 113 (60%) of the publications appear in 56 different peer-reviewed journals

A.1.1 Publication lists to support the bibliometric analysis of NRP 59

For the bibliometrics analyses of NRPs 60 and 61, we used the publications data for the two programmes from the SNSF's research information system P3 (downloaded June 2017). However, for NRP 59, there was an added difficulty, in the it is the last NRP not to be fully captured by P3. At the time of download, only nine publications were listed for NRP 59 in P3, which meant that the publication list for NRP 59 had to be created manually.

We began this process by conducting a manual search. This involved taking the nine publications logged on P3 as a starting point. We then drew on the final reports of each NRP 59-funded project, which list additional publications. Finally, we conducted a web search, focussing largely on the NRP 59 programme and project web sites, some of which contained information of published academic outputs. After eliminating duplicates, this yielded a list of 114 academic outputs, of which 80 are journal articles.

Whilst these quantities are comparable in scale to the other two NRPs to be evaluated here, we could not be sure how much of the 'true' total publication output of NRP 59 was covered by this list, or indeed, whether any items we had traced had been included erroneously.

We therefore contacted each NRP 59 project PI, sending them each a list of the publications we had associated with their projects, asking them to add any missing ones, delete any erroneously included ones, or simply confirm that our information was complete and correct. We received replies for 17 out of 29 projects (so 12 did not reply).

No items were removed, so we are confident that no outputs are listed erroneously. In total, the PIs added 41 outputs to the list we already had. The variation per PI was considerable, but on average, 2.4 publications were added to our records per project as a result of this exercise.

Assuming that the 'return' information would have been similar for the 12 projects whose PIs did not respond, we can estimate that the total volume of published academic outputs of NRP 59 is around 184 items, of which around 136 are journal articles. Our list of 155 confirmed items therefore has an estimated coverage of 84% of the true total academic outputs volume.

With this coverage estimate, our bibliometric analysis of NRP 59 therefore allows for authoritative conclusions, as well as for estimation of total productivity. We also note that there are only three out of the 29 projects for which we have no confirmed outputs at all.

[48] This may be not the exact figure in reality – author names are not provided in one single form and despite the effect of cleaning, there may be errors.

Table 8: Estimates for NRP 59 output numbers

	Total academic publications	**Journal articles only**
Confirmed through desk research (existing P3 data, project reports, NRP & project web sites)	114	80
PIs responded to mail-out	17	17
PIs not responded	12	12
Confirmed after mail-out	155	113
Additional outputs	41	33
Additional outputs per project (/17)	2.412	1.941
Estimated number of missing outputs (*12)	29	23
Estimated total outputs	184	136
Estimated coverage of confirmed outputs	84%	83%

A.1.2 Outputs and authors

The 155 publications do not only include journal articles but also books, book chapters and a small number of Ph.D. theses' and other reports, as well as two synthesis reporting items, which we exclude from much of the analysis here. The type of publication is broken down in Table 9. About 70% are articles, followed by 21% of books and book chapters while other publications obtain a share of 8%.

Table 9: Number of publications by type

Type of publication	**Books/Monographs**	**Book chapter**	**Article**	**Other**
Number	4	29	108	12
Share	2,6%	18,7%	69,7%	7,7%

Note: Three anthology chapters were classified as journal articles by the researchers. They have been reassigned as book chapter, two were included twice.

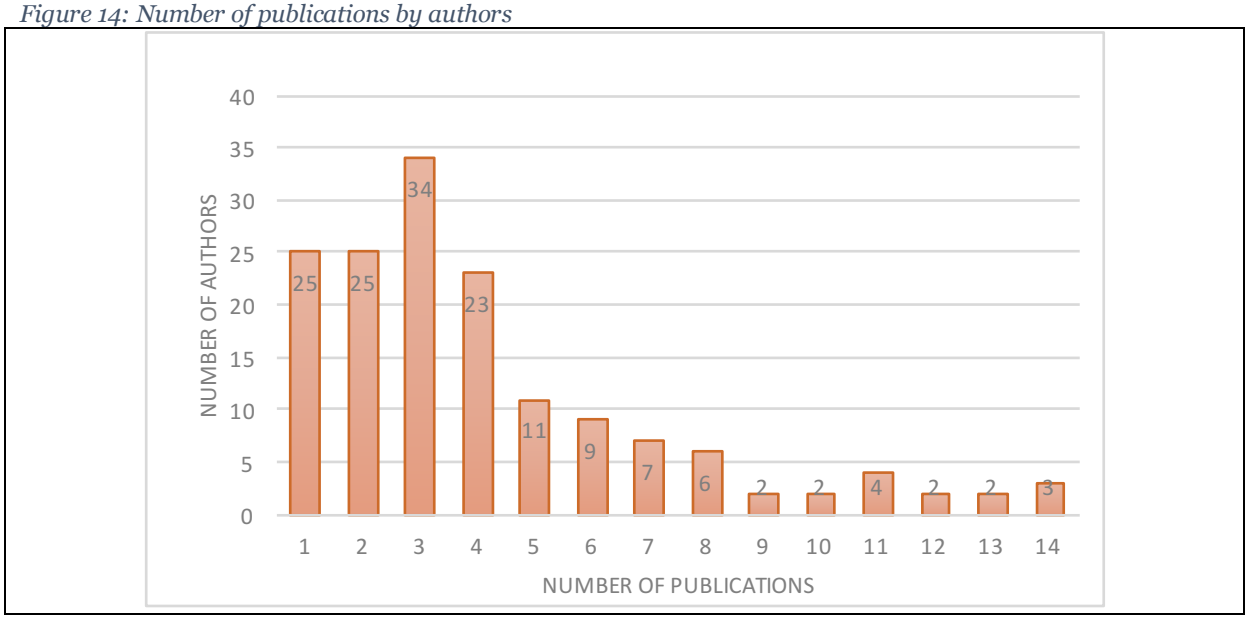
Citation analysis is only possible for the journal publications. Therefore the 108 publications classified by the researchers as articles were further analysed. Three are published in Swiss German speaking journals, while nine are publications in collections of the IOBC or the USDA. These 12 publications are not included in Scopus and thus, for almost 100 journal articles, citation analysis is feasible.

With about 70% share of peer-reviewed articles, the output is clearly aimed towards academic publishing.

A total of 648 author names appear for these 153 publications. Since many of them appear on more than one publication, the total number of individual authors comes down to 268. Among the 73 researchers leaders listed, 45 appear and 28 do not appear as authors, suggesting collaboration with 195 individuals not formally acknowledged as being directly associated with the NRP.

Figure 14 indicates how many of these 153 publications are published by one or more authors. 16% are single authored publications – this is rather high since a normal distribution suggests an increase from single to multiple authored publications – a pattern which tends to be the norm for journal article publications. A cross-check with the type of publication of these single authored publications indicated that 14 where journal articles and the remaining were Ph.D theses, reports or book chapters. Among the 108 journal articles, the share of single authored articles is 13%.

Figure 14: Number of publications by authors



About 67% of the author names (179 individuals) appear only in one publication, 27 appear in two. Five author names appear in 16 publications or more. There is a fairly clear sense of a small core-group of authors associated with many NRP 59 publications, and a large group of more peripheral contributors (Table 10).

Table 10: Recurrence of authors across publications

Nr of publications	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Number of author names	179	27	11	12	9	8	3	3	4	4	3	0	0	0	0	1	1	3

The publications cluster strongly around 2010/11, with a tail of fewer publications per year right up to 2017. There are five publications which are clearly before the funding period and even the 3 from 2007 are unlikely to stem from the NRP itself.

Table 11: Number of publications by year

Year	**2002**	**2003**	**2005**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Nr of publications	2	1	2	3	6	21	33	49	23	6	3	4	1	1

A.1.3 Impact of the publications & wider context

To analyse the impact of the outputs, there are indicators such as external citations or citations per publication. The impact of the journals is an additional indication. To start with the latter, the journal articles appear in 41 different Scopus-covered journals. Only a handful journals in which the projects published are not included in Scopus. Many journals contain only one NRP 59 publication, but there are a several where more than two articles were published. The largest number of articles could be found in the Swiss journal 'Agrarforschung Schweiz'. Many of the journals have a high Scimago journal ranking, indicating that these are internationally recognised publication platforms.

Table 12: Numbers of NRP 59 articles per Journal, sorted by Scimago journal rank (SJR)

Journal	Nr of NRP 59 publ.	SJR	Journal	Nr of NRP 59 publ.	SJR
Plant Cell	1	5.516	PLoS ONE	9	1.201
New Phytologist	1	3.573	Science Communication	1	1.182
Plant J.	1	3.351	International Journal of Public Opinion Research	1	1.064
Plant Biotechnol J.	4	2.842	Basic and Applied Ecology	3	1.053
Journal of Experimental Botany	1	2.78	Applied Soil Ecology	2	1.002
J Biol Chem.	1	2.755	Transgenic Research	7	0.991
Environmental Science & Technology	7	2.538	Public Understanding of Science	2	0.985
Biochem J.	1	2.341	Journal of Biotechnology	1	0.978
Evolutionary Applications	1	2.299	Risk Analysis	2	0.955
Environmental Microbiology	1	2.221	European Journal of Soil Biology	1	0.904
FEBS Journal	1	2.212	Journal of Applied Entomology	1	0.839
MPMI	1	2.186	Tree genetics & genomes	1	0.773
Annals of Botany	1	1.894	Pedobiologia	1	0.737
Applied and Environmental Microbiology	3	1.691	Crop Science	1	0.731
Food Policy	1	1.681	J Microbiol Methods	1	0.723
Biology Letters	2	1.653	Sustainability	1	0.524
Biotechnology Journal	1	1.653	GM Crops and Food	1	0.491
Field Crops Research	1	1.577	Biocontrol Science and Technology	1	0.446
Biology and Fertility of Soils	2	1.343	Human and Ecological Risk Assessment	1	0.435
Curr Opin Cell Biol	1	1.29	Agrarforschung Schweiz	11	0.219
Plant and Soil	1	1.267	Acta Horticulturae	2	0.18

Source: Scopus/Scimago

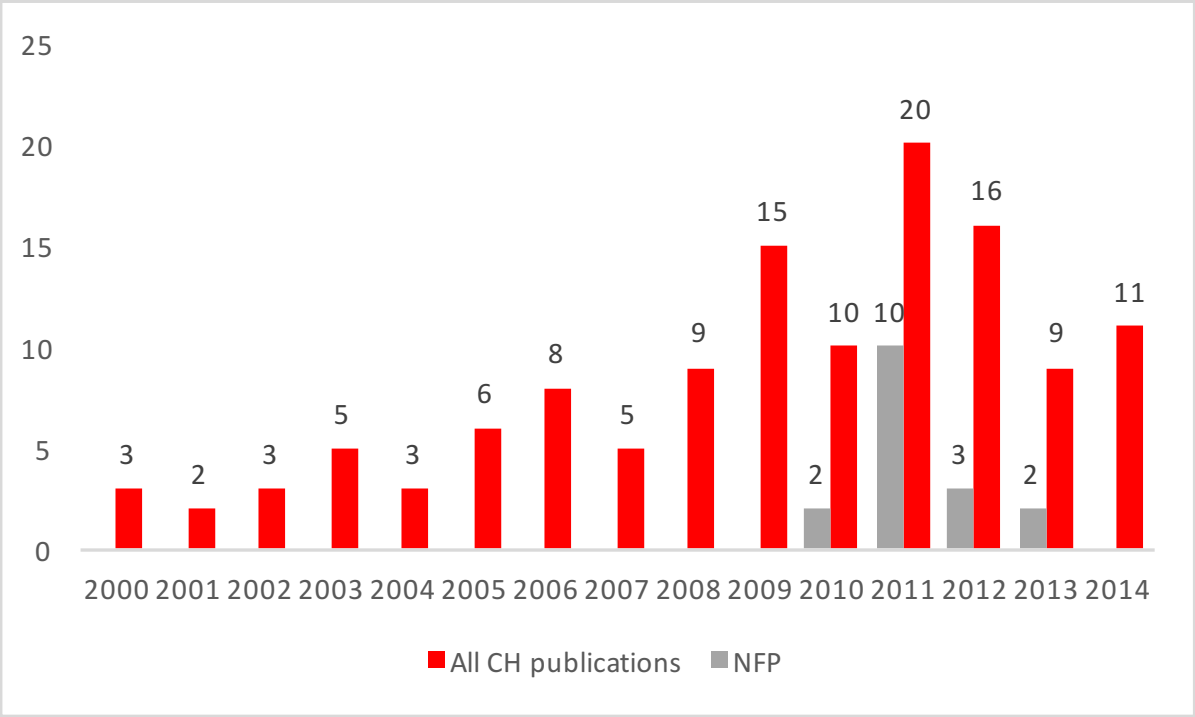
To adequately assess the contribution of this NRP, it is worth looking at the academic publishing in the field as such. GM plants are not a very widely academically researched subject matter in many countries: if a country has severe restrictions around GM plants, it is unlikely that public research obtains a lot of financial means. Secondly, much of the research is done by the private sector – which does not publish a lot. In the Swiss case, the moratorium may have had a similar effect on research. Therefore, we looked at publications from the year 2000 to 2014. In this period, almost 3,400 relevant publications can be identified worldwide. The leading country is the US with 700 publications, followed by UK (550), Germany (290), and France (180). Switzerland comes in at position 10 with 125 publications. In 2000,

105 Swiss articles and reviews were in this scientific field while by 2014, the number rose to almost 260 – an average annual growth of 6.6%.

If we look at the individual organisations, the most prolific one is the Dutch Wageningen University – one of the largest agricultural universities in Europe – with almost 100 publications. The top Swiss institution is Forschungsanstalt Agroscope Reckenholz-Tanikon (37 publications) placed 8th worldwide, the second Swiss institution is the ETH Zurich (23 publications).

If we focus on the 125 Swiss publications, one can clearly see that GM plants are not a major field with many publications, yet, it seems that the NRP had its impact on the overall outputs (see Figure 15). The grey bars indicate the publications mentioned by the NRP researchers, which are equally in the Swiss share of Scopus-listed items on GM plants. In particular for 2011 publications, half of the Swiss GM plant research stems from NRP funded research.

Figure 15: Number of GM plants related publications by Swiss organisations, by year



By using a three-year citation period and having excluded self-citations, the whole sample of 125 Swiss publications obtains a citation per publication (CPP) rate of 4.1. Excluding the NRP publications, the CPP is 3.9. If we look at these 17 NRP publications only, they obtain a **CCP rate of 5.1.** If they are compared to the rest of the Swiss publications between 2010 and 2013 only, the NRP publications do by far better than the other Swiss publications with a CPP of 3.5. If we remain in this period 2010-2013, a significant difference with the rest of the Swiss publications can be seen: while all NRP publications were cited externally, almost 40% of the 38 Swiss publications remained non-cited.

We conclude that the NRP clearly has an effect on the academic publishing in this area in terms of quantities and in terms of impact.

A.2 Bibliometric analysis – NRP 60

- NRP 60 resulted in 124 publications; these resulted from 16 out of 23 funded NRP 60 projects
- 62% are articles, 25% book chapters, the remaining 13% 'other'
- 46 of the 78 researchers participating in NRP 60 appear as authors in the listed publications. An additional 42 other authors were identified
- The average number of publications per project for the whole NRP is 5.4, if only the publishing 16 projects are taken, the average is 7.8
- 61 (49%) of the publications appeared in 33 different peer-reviewed journals
- 15 NRP 60 articles are published across 11 journals listed in Scopus or ERIH-PLUS, indicating some international reach
- Overall, Switzerland is not a leading country in gender equality research, so somewhat modest achievements (in international comparison) are to be expected

A.2.1 Outputs and authors

The P3 data for NRP 60 provides a list of **124 publications**, only one was an edited publication without authors. The largest share of outputs are single-author items, and almost all outputs have less than five authors.

Table 13: Number of publications by author(s)

Authors	1	2	3	4	5	6	7	8
Publications	48	32	21	17	2	0	0	2

Major publication activity is clustered around 2012, 2013 and 2014, with a small number of further outputs published up until and including 2017. Given that the projects started at the end of 2010 and the publication process takes several months or, in case of peer-reviewed publications, between one and two years, the four peer-reviewed publications dating from 2010 are most likely not outputs of the NRP but were produced prior to the launch of NRP 60, though they are nevertheless listed in P3 as NRP 60 outputs. In the group of the 2011 articles, only one is peer-reviewed. Even for these publications, one can assume that most of the research was already conducted before the NRP 60 funding started. At the other end, 24 publications have the status 'accepted'. Seven of these are book chapters, one is a proceeding and the remaining 15 are journal articles.

Table 14: Number of publications by year

Year	2010	2011	2012	2013	2014	2015	2016	2017	No year
Nr of publications	4	11	18	30	24	9	3	1	24

78 individuals are listed as participating researchers in NRP 60, of which **46 can be recognised as authors** in these 123 publications while 32 do not appear with a publication. However, another **42 non-participating co-authors** can equally be identified. It is not known whether these authors are colleagues for the same faculties as the colleagues funded, or international co-authors. However, German and French names dominate, thus it is likely that many of these 42 extra researchers are from Swiss universities, or neighbouring countries.

In terms of the gender of the 46 authors, 32 are female, while 14 are male. This **high share of female authors** can be expected, since gender-related topics tend to be researched by a high share of women. In most other fields – even in the social sciences – the ratio of male to female authors is in favour of the male authors. Table 15 indicates the number of authors by total number of their publications mentioned,

and the number of female authors, for example the second column indicates that six authors have two publications. Out of the six authors, five are women.

Table 15: Number of publications by author and female author

Publications	1	2	3	4	5	6	7	8	9	10	11	12
Nr of authors	11	6	8	5	6	3	2		2			3
Of which are female authors	7	5	3	3	5	3	2		1			3

NRP 60 had 23 individual projects. Seven did not list any publication; among those are four led by private sector participants, as well as the final synthesis project, which ran from 2014 to 2016. The other 16 projects vary between one and 17 publications. These can be classified in peer-reviewed (61 publications, or 49%) and non-peer-reviewed (63 publications, or 51%) ones. This distinction is important, as the scientific nature of non-peer-reviewed outputs is not immediately evident, and databases such as Scopus and Web of Science only include peer-reviewed journals.

Taking into account only the peer-reviewed ones, 15 projects have between one and eight publications. If we take only the 16 projects with publications, the average is 7.8 publications, or 3.8 peer-reviewed publications. If all 23 projects are taken into account, the average goes down to 5.4 publications or 2.6 peer-reviewed publications.

A.2.2 Impact of the publications

While citation analysis and the impact of journals can rather simply be measured in the 'hard sciences', bibliometric analysis still faces numerous problems with social sciences and humanities. Hicks (1999, 2005) listed a number of factors, which still need to be taken into account for a bibliometric analysis of the social sciences and humanities:

- fragmented literature and book publishing
- citations to books
- national literature
- perceived scholarliness of journals[49]

A factor that renders citation analysis especially problematic is that social sciences and humanities research is often written in the national language, while the Social Science and the Arts & Humanities indices of the Web of Science (WoS) or Scopus are dominated by English-speaking journals. The 61 peer-reviewed articles from NRP 60 were published in 33 different journal sources; 8 of these journals are listed in Scopus, containing a total of 12 NRP 60 articles.[50]

However, it is possible to expand slightly beyond Scopus in terms of assessing the recognition of journals. Due to the absence of an international 'core literature' for most social sciences disciplines, there is not much consensus on the scholarliness of journals. While a researcher publishing in journal x finds the journal scholarly, other experts may not share this view. An attempt in the social sciences and especially in the humanities to overcome the shortcomings of the commercial databases and their limited coverage has been addressed by the European Science Foundation with the creation of the European Reference Index for the Humanities (ERIH PLUS). This index contains currently (summer 2017) about 8,600 journals from all over Europe that are considered highly important.

[49] Hicks, D (1999): 1999. The difficulty of achieving full coverage of international social science literature and the bibliometric consequences. Scientometrics.44(2): 193-215. Hicks, D (2014): The four literatures of social sciences, in: Moed et al (eds) (2005): Handbook of Quantitative Science and Technology Research. See also: Archambault, E.; Vignola Gagné, E (2014): The use of bibliometrics in the social sciences and humanities. Report prepared for the Social Sciences and Humanities Research Council of Canada (SSHRCC)

[50] One article, which was 'accepted' from the list of publications could not be identified.

We checked, which of the journals featuring publications from NRP 60 are covered in this index. Six journals (French, German and English) are covered here, three of them are also included in Scopus. Clearly, not only journals covered in Scopus (or the WoS) are important for a given scientific community – the journals covered are perhaps only a fraction of the journals important to the researchers, but they have obtained a very prominent status.

Table 16: Journals included in Scopus and/or ERIH-PLUS

Journal title	Index	Number of NRP 60 articles
Equality Diversity Inclusion: An International Journal	Scopus	4
European Journal of Social Work	Scopus	1
Evidence & Policy	Scopus	1
International Review of Sociology	Scopus	1
Revue Française de Science Politique	Scopus	1
European Early Childhood Education Research Journal	Scopus, ERIH-PLUS	1
Femina politica. Zeitschrift für feministische Politikwissenschaft	ERIH-PLUS	2
Nouvelles Questions Féministes	Scopus, ERIH-PLUS	1
Revue française de pédagogie	ERIH-PLUS	1
Travail genre et sociétés	Scopus, ERIH-PLUS	1
Zeitschrift für Soziologie der Erziehung und Sozialisation	ERIH-PLUS	1

These findings indicate that at least a section of the outputs produced by NRP 60 is published in internationally recognised sources. However, while citation analysis is a useful means in many disciplines, it cannot be used here for this NRP, mainly because there are only a handful of articles covered in Scopus, for which citation analysis would be possible.

A.2.3 The outputs in context

NRP 60 addressed gender equality in the Swiss context. In another step, we analysed how NRP 60 compares to other outputs in the field of 'gender equality' more broadly. Since the projects were funded between the end of 2010 and early 2016, we took 2011-2016 as the relevant publication period (since 2017 is not yet complete at the time of analysis).

When searching for 'gender equality' or 'egalite des sexes' or 'Gleichstellung' (in order to allow for French and German publications too), Scopus lists almost 3,200 outputs – including more than 130 books and 360 book chapters. About 670 documents are from the US, followed by 430 from the UK, and 240 from Sweden. Spain, Canada, Australia, Germany, Norway, and South Africa all have more than 100 publications. Switzerland accounts for 50 publications. If we take articles and reviews only, the total number of publications is limited to 2,500, the Swiss number goes down to 35, the Swedish one down to 206.

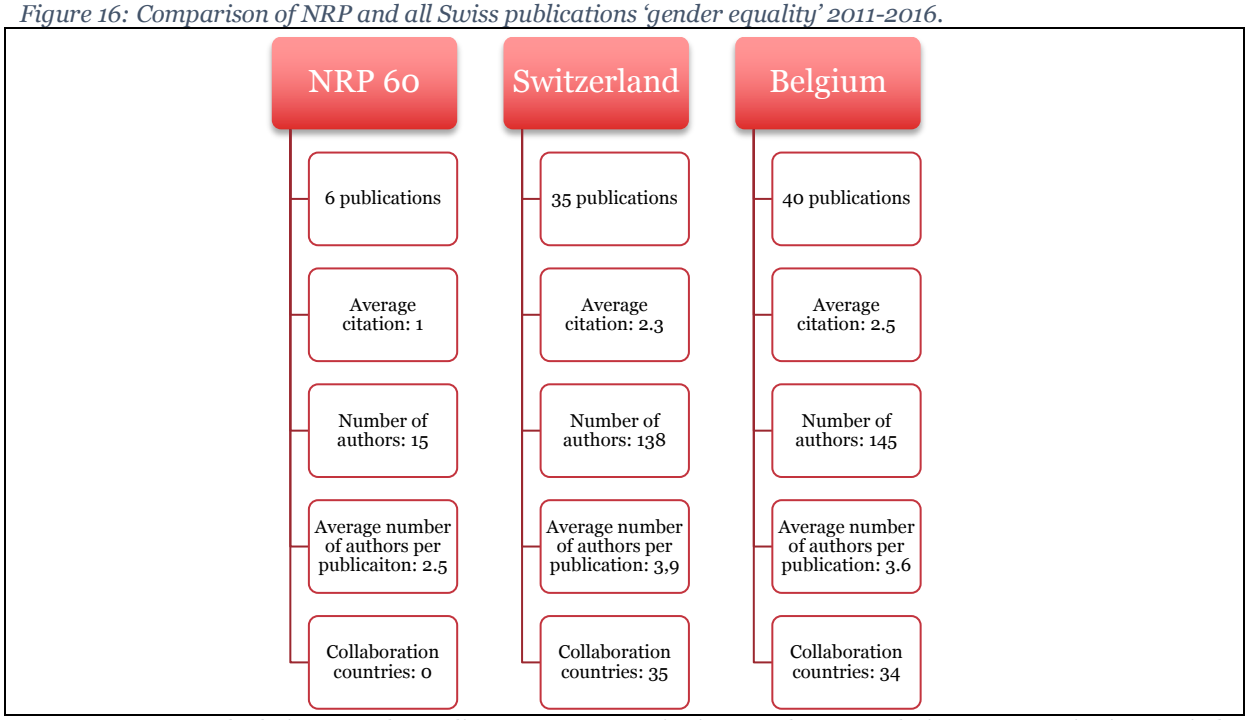
This 'ranking' in terms of publications indicates that some countries are more 'specialised' in this topic than an average scientific profile would suggest: given the publication volume of countries, the US tend to come first, followed by the UK and other English-speaking countries (Canada, Australia), but then, larger western European countries such as Germany, France, Spain, Italy and the Netherlands typically appear. Having Sweden appearing as third main producer of scientific literature in gender equality suggests that this topic is rather prominent in Sweden.

Interestingly, Sweden is a good comparator case with Switzerland when considering the publication volume of the two countries. In 2016 for example, when all arts and humanities publications are counted,

Switzerland had 1,330 citable documents while Sweden counted 1,260 (Scimago Journal and country rank). The gap in terms of gender equality publications suggests that the topic does not have the same standing in Switzerland as it does in Sweden.

Comparing the six Scopus-listed NRP 60 publications with 35 Scopus publications with a Swiss affiliation and with the key word "gender equality" shows some interesting differences (see Figure 16). Most striking is the difference in citations and its link to international collaboration. This can also be seen when we once again add a comparator country, in this case Belgium, which has a similar publication volume around 'gender equality', and additionally offers good grounds for comparison as a multi-lingual country. International collaboration is a known fact driving visibility and citations, in particular for smaller, non-English speaking countries. Purely national publications, often with only one or two authors, 'perform' less well than international co-publications with several authors.

Figure 16: Comparison of NRP and all Swiss publications 'gender equality' 2011-2016.



Source: Scopus, calculations: Technopolis Group; Note: Citations: only external cites, 3 year citation period. Incomplete period for 2016 publications.

We also compared the authors (i.e. all funded NRP researchers) with the set of almost 140 authors in the Swiss set of 35 Scopus publications. Three NRP-funded researchers and two (non-listed) collaborators can equally be identified in the 35 Swiss Scopus publications. This may suggest that the NRP funded researchers are not necessarily Swiss core experts in gender equality, but used their different thematic backgrounds and the NRP funding to provide findings on gender matters in the Swiss context (this is in fact confirmed by many of our interviews for this study).

It is also worth noting that all six Scopus-listed NRP 60 publications are based exclusively on intra-Swiss collaborations. This has not helped to gain international visibility through international peer-reviewed publications in the field of gender equality. Thus, the NRP participation may have contributed to the overall knowledge base about 'gender' in the Swiss academic organisations and the private sector but it has only moderately contributed to international visibility through publications.

A.3 Bibliometric analysis – NRP 61

- NRP 61 resulted in 190 publications; these came out of 16 of the 22 projects (incl. synthesis projects)
- 71% are articles, 12% book chapters, 7% proceedings and the remaining 10% 'other'
- 74 of the 93 participant researchers of NRP 61 are authors in the list of publications. An additional 438 other authors also appear in the list
- The average number of publications for the publishing NRP projects (so excluding those with no listed publications) was 11.8, including on average 9 peer-reviewed and 2.9 non peer-reviewed publications
- 113 (60%) of the publications appeared in 56 different Scopus-listed peer-reviewed journals
- 18 of the 56 journals are classified in 'water science and technology' – the majority of the articles here are within the top 25% of journals with the highest impact in the category
- The peer-reviewed articles obtained on average 6.9 citations per publication
- There is a low share of non-cited publications (8.5%)

A.3.1 Outputs, authors and networks

The P3 data for NRP 61 provide a list of **190 publications**, which are broken down by type in Table 17. About 71% are articles, followed by 12% books and book chapters. Proceedings play a lesser role with about 7% and other publications obtain a share of 10%.

With a 75% share of peer-reviewed articles, the output is clearly aimed towards academic publishing.

Table 17: Number of publications by author(s)

Type of publication	Books	Book chapter	Article	Proceedings	Review	Other
Peer-reviewed	5	10	113	14	1	
Non peer reviewed	2	5	21			19
Share	3,7	7,9	70,7	7,3	0,5	9,9

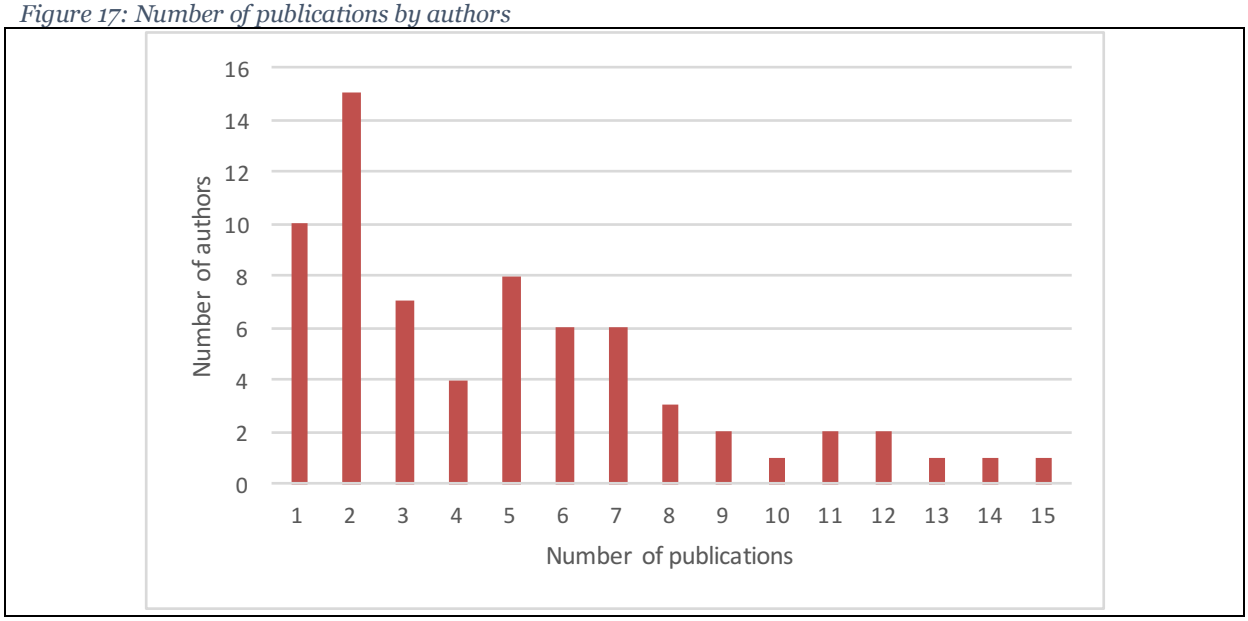
Note: One publication was marked as "editor" but in fact is an article; one article was included twice

These publications were the output of 16 of the 22 projects. Synthesis projects are not included in these 16, but the additional project, "Methoden der inter- und transdisziplinären Wissensintegration im NFP 61 Syntheseprozess" is. In all but three, the peer-reviewed publications dominate – these three projects were led by EAWAG and Stiftung Landschaftsschutz Schweiz. In these three projects, publications to the general public were rather frequent.

The projects had **on average 9 peer-reviewed and 2.9 non peer-reviewed publications** with a minimum of 3 and maximum of 20 peer reviewed and zero to 11 non peer-reviewed publications.

A total of 512 authors are mentioned for these 190 publications. Among the 93 individuals listed as participating researchers in NRP 61, 19 do not appear as authors. The remaining **74 participants author between one and 15 publications.** In absolute numbers, most participants author either two publications (15 persons) or one (10 persons) (see Figure 17).

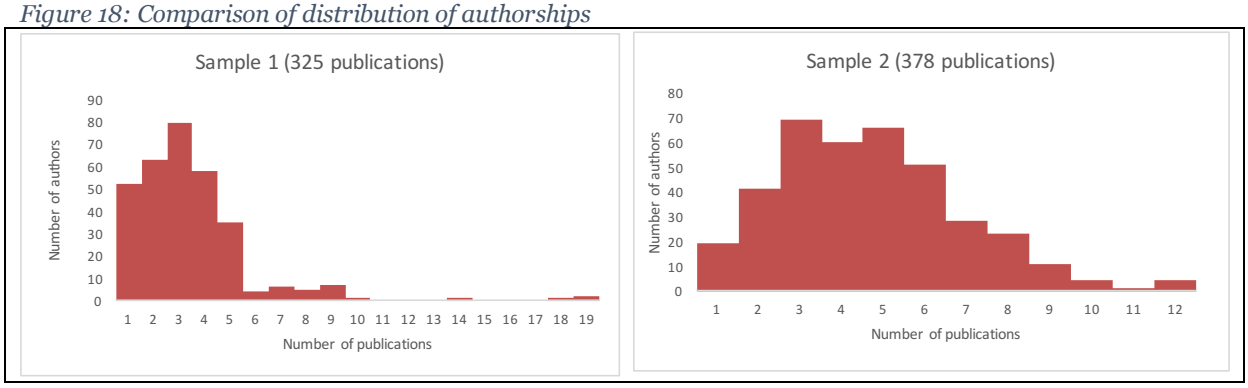
Figure 17: Number of publications by authors



The dominance of one or two authors suggests that single authored publications and established pairs of co-publications with two authors dominate. If this pattern is common in the field of water research was then cross-checked with two random samples of publications in the field.

Comparing the two random samples of publications (see Figure 18) with NRP 61, the shape of the distribution curves of the control samples vary to some extent, but they are more similar to each other than to NRP 61. In comparison, there are differences, for example, it appears that there are 'too many' papers authored by +7 authors in the Swiss NRP case. In Sample 1, almost 92% of the publications have one to four authors, in sample 2, the share is 67% while in the Swiss NRP, only 64% are in this range. However, almost 28% of the publications have more than seven authors –compared to 7 and 19% respectively.

Figure 18: Comparison of distribution of authorships



Source: Scopus; calculations: Technopolis Group

Note: Random sample 1: based on 2015 articles and reviews, all countries in the field of 'water management', limited to energy, random sample (2) based on 2015 and 2016 articles and reviews, all countries in the field of "water research".

The large majority of publications clusters around the years 2012, 2013 and 2014, with a 'tail' of further publications right up to 2017.

Table 18: Number of publications by year

Year	2010	2011	2012	2013	2014	2015	2016	2017	No year
Nr of publications	6	29	39	59	24	10	4	3	16

The projects were funded between early 2010 and the end of 2014. It is unlikely that peer-reviewed publications stemming from the NRP 61 funding were already published in 2010/11 (given the time-consuming peer-review process). Among the 2010 publications, two are most likely not direct outputs of the project funding but were achieved beforehand, but they are listed as NRP 61 outputs in P3 nevertheless. Initially, 29 publications were listed without a publication year. Since almost half were in journals, we were able to identify 12 of these. The remaining publications could also be classified as 'other' – they are for example project reports or published on the web. While one would expect that the publications listed are from projects and the people funded, there is at least one publication by a single author who is not in the project list.

A.3.2 Impact of the publications

To analyse the impact of the outputs, there are indicators such as external citations or citations per publication. Also, the impact metrics of the journals themselves can serve as proxies. To start with the latter, the 113 peer-reviewed articles appeared in 56 different journals covered in Scopus. To estimate their impact, we used the Scimago Journal and Country ranking, which defines a specific subject category, namely 'Water science and technology'. The category encompasses 225 journals. These journals are classified in quartiles, measured by the Scimago journal rank (SJR) indicator.

18 journals in which the NRP 61 researchers were publishing are included in the 'Water science and technology category'. Many are top ranked journals and it should be noted that in both the 3rd and 5th top ranking journals, eight NRP 61 articles were published.

Table 19: Scopus-covered journals ranked according to Scimago

Rank	Title	SJR	SJR Quartile	Number of NRP publications in journal (total period)
3	Water Research	2,629	Q1	8
4	Water Resources Research	2,383	Q1	6
5	Hydrology and Earth System Sciences	2,216	Q1	7
7	Journal of Geophysical Research	1,996	Q1	3
9	Journal of Hydrology	1,745	Q1	2
12	Hydrological Processes	1,446	Q1	1
19	Hydrogeology Journal	1,097	Q1	1
20	Aquatic Sciences	1,076	Q1	1
29	Ground Water	0,964	Q1	3
42	Journal of Environmental Planning and Management	0,798	Q1	1
58	Environmental Earth Sciences	0,574	Q2	1

65	Water Policy	0,536	Q2	1
89	Water Science and Technology	0,394	Q2	1
122	Grundwasser	0,248	Q3	1
132	Houille Blanche	0,226	Q3	1
147	Hydrologie und Wasserbewirtschaftung	0,186	Q3	1
153	Hydrobiologica	0,162	Q4	2

Source: Scimago
Note: 'rank' provides the rank of the journal in 2016 according to its Scimago Journal Rank. This is linked to the "SJR Quartile and the actual impact factor of the journal.

Citations are another important indicator. When taking only external citations into account, the NRP 61 publications do very well: for 82 publications that could be identified and for which citation data is available, **an average citation rate of 6.9 citations per publication** was achieved (taking a fixed citation period of publication year plus two years citation window). By year, this indicator changed – this is in particular due to one of the two publications from 2010 (questionable as NRP output), which was the most cited article among the works. What is remarkable is the very low share of non-cited publications. If we remain in the three-year citation period, only 8.5% remained non-cited.

Table 20: Citation/publication ratio, by year

Year	2010	2011	2012	2013	2014	2015	2010-2015 average
Citation per publication ratio	28.5	9.3	6.8	6.2	6.8	6.7	6.9

Note: calculations for 2016 and 2017 publications were omitted given the limited citation period

A.3.3 The figures in context

NRP 61 addressed broadly water management, but also water quality, groundwater and a number of related aspects which can be grouped under climate change, environmental sciences etc. Switzerland is a world leader in these scientific specialisms. According to the Scimago analysis, Switzerland is among the top 20 countries worldwide publishing in 'water science and technology' – between 2011 and 2016, it varied in ranking between Nr 15-18. While the total number of publications varied between 370 and 500 citable documents (between 2011-2016), Switzerland has a remarkable citation per publication rate: in all years, it is either the top or among the leading four countries.[51] For the complete available period (1996-2016) Switzerland leads the top scoring European countries with 24.11 citations per publication, followed by Denmark and the Netherlands and far ahead of the US, Japan, Germany or Spain – countries which publish a much larger volume of articles.

If we analyse the development of "water management" articles from 2005-2016, the average annual growth rate was 7.3% reaching about 5,700 in 2016. Most of this growth is due to the publishing habits of Chinese researchers (as well as a higher coverage of Chinese journals) – China obtained an annual growth rate of 16.6%, thus reaching the status as second largest publishing country in water management following the US. While the large European publishing countries Germany, Spain, the UK, France, Netherlands and Italy reached between 2,800 (Germany) and 1,600 (Italy) publications in 2016, Switzerland follows next with almost 900.

[51] See the data for 2016 in water science and technology at http://www.scimagojr.com/countryrank.php?category=2312&year=2016 (accessed 01/02/2018)

Among the ten most prolific organisations, i.e., those who published the most, we can find six Chinese ones, one Australian and three from Europe: the Dutch Wageningen and Delft universities and the Swiss Federal Institute of Aquatic Science and Technology (EAWAG).

Among the leading Swiss organisations in terms of scientific publications, followed by the EAWAG (350 articles) comes with some distance the ETH Zurich (220) and again with some distance the Ecole Polytechnique Federale de Lausanne (100). The universities of Geneva, Berne, Basel and Lausanne have between 30 and 50 publications in this 2005-2016 period. The water competence in Switzerland is therefore primarily focused at EAWAG and the two federal technical universities. In this respect, NRP 61 can be seen as a way to strengthen existing competences – 13 projects (or 14 including the summary project) were led by ETH Domain partners. The universities of Zurich, Bern or Neuchatel (who also led projects in NRP 61) have by far not the same scientific profile as the ETH Domain partners.

Appendix B Further analysis – Classifying NRP archetypes

B.1 Background to this analysis

Following the interim results presentation of this study, it was agreed that it would benefit from a wider assessment of several more NRPs, in order to develop a more comprehensive typology of different NRP archetypes.

We found that the three NRPs evaluated here in detail each were fundamentally different in terms of how they positioned themselves in relation to their subject matter, resulting in quite different programme archetypes – 'advocacy', 'decision support', and 'steering'. Each of these has its own specific implications in terms of, for instance, knowledge transfer, likely audience, potential for conflict or political resistance, or the likely extent of co-creation and closeness to non-academic stakeholders. However, analysis of just three NRPs tells us little about how prevalent the three identified archetypes are across the NRP instrument or, indeed, if there are any further archetypes.

We therefore conducted an additional analysis, which aimed to identify the archetype of every completed NRP since NRP 50, resulting in a set of 17 NRPs (including the three already evaluated). Stretching further back in time (e.g. all the way to NRP 1) would have risked placing an excessive focus on the distant past, while this smaller selection allows for a more current assessment of the NRP 'landscape'.

For each NRP we conducted a brief document analysis, focussing specifically on three documents in each case:

- Implementation plan (Ausführungsplan)
- Final report (Schlussbericht) or in some cases Synthesis Report (Synthesebericht)
- KT concept (WTT Konzept)

Those NRPs that could easily be identified as one of our three archetypes were immediately categorised accordingly. This was possible for six NRPs. For the remaining eight, an initial archetype-option was developed for each one, based on a range of criteria (e.g. type of aims, types of stakeholders, anticipated findings, description of the problem/ situation to be addressed, the NRP's self-described relationship to that problem or situation). This crystallised another two archetypes, creating a five-way typology. All 17 NRPs were then each briefly appraised again, in order to confirm that all had been classified appropriately. In most cases, the list of aims, as well as the description of the problem to be addressed by the NRP were the most fruitful elements in classifying each programme.

B.2 A typology of NRPs

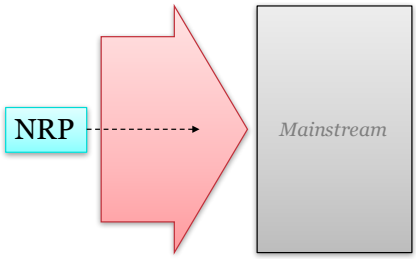
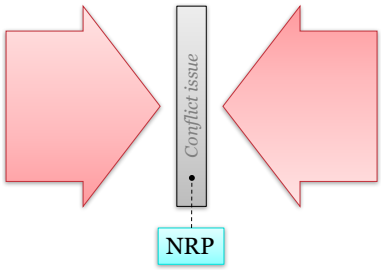
Our analysis yielded a typology of five NRP archetypes. Importantly, these fall into two categories:

- Conflict models, where the existence of a societal or political struggle, disagreement, debate or conflicting interest is acknowledged and the NRP positions itself within or around it
- Development models, which primarily situate themselves in a forward-looking trajectory, and chiefly look to assess and/or shape possible future(s)

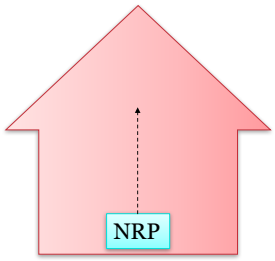
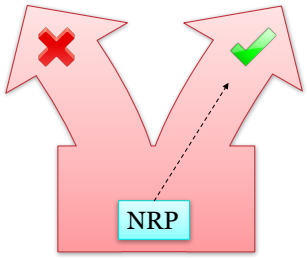
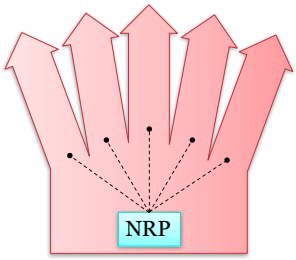
We define two conflict models, 'Advocacy' and 'Decision support', and three development models, 'Acceleration', 'Steering' and 'Orientation'. We present the full illustrated typology in the figure below, including basic characteristics, as well as the specific NRPs that fall into each archetype.

Figure 19: A typology of NRPs

Conflict models

Advocacy	Decision support
	
Position: Support one side (or several 'allied' sides). The 'Mainstream' might not be a clearly defined or vocal adversary	**Position: Act as an arbiter between two (or more) identifiable sides in a debate or conflict**
• NFP 51 "Integration und Ausschluss" • NFP 58 "Religionsgemeinschaften, Staat und Gesellschaft" • NFP 60 "Gleichstellung der Geschlechter" • NFP 67 "Lebensende"	• NFP 59 "Nutzen und Risiken der Freisetzung gentechnisch veränderter Pflanzen"

Development models

Acceleration	Steering	Orientation
		
Trajectory: Positive; must be supported	**Trajectory: Potentially hazardous; must be changed/ steered**	**Trajectory: Unclear; must be explored**
• NFP 53 "Muskuloskelettale Gesundheit – Chronische Schmerzen" • NFP 62 "Intelligente Materialien" • NFP 63 "Stammzellen und regenerative Medizin" • NFP 66 "Ressource Holz"	• NFP 50 "Hormonaktive Stoffe: Bedeutung für Menschen, Tiere und Ökosysteme" • NFP 54 "Nachhaltige Siedlungs- und Infrastrukturentwicklung" • NFP 56 "Sprachenvielfalt und Sprachkompetenz in der Schweiz" • NFP 61 "Nachhaltige Wassernutzung"	• NFP 52 "Kindheit, Jugend und Generationenbeziehungen im gesellschaftlichen Wandel" • NFP 57 "Nichtionisierende Strahlung – Umwelt und Gesundheit" • NFP 64 "Chancen und Risiken von Nanomaterialien" • NFP 65 "Neue urbane Qualität"

B.3 The Archetypes explained

Advocacy

This model focuses on groups of individuals who are in a disadvantaged position, and aims to generate findings and KT activities that will contribute to lessening the disadvantage. NRPs of this type tend to posit a notion of a 'Mainstream' society, and highlight that its norms, practices or policies or laws put certain individuals at a disadvantage. In short: NRPs of this type take sides, and in this sense they adopt a somewhat normative or partisan position. The aim of these programmes is to ensure that the disadvantage, exclusion or inequality faced by the groups of interest is overcome or lessened. In some cases, this partiality of a publicly funded programme is justified on constitutional grounds (for instance for NRP 60, where the programme documentation cites the Swiss equality law alongside evidence that gender equality has yet to be achieved). These programmes tend to be more focused on social scientific research. This is a corollary of having particular groups of people as the main focus – rather than particular types of technology or areas of science.

The notion of advocacy does not mean that these NRPs thereby also identify specific groups that they oppose – our analysis found no evidence of this. Instead, 'mainstream' society tends to be envisaged as an established (and potentially outdated or otherwise inadequate) set of norms and practices that may not be endorsed by anyone in particular, but whose reform can bring about better outcomes for the disadvantaged groups in question. NRP 67 ('End of life') is an illustrative example: the documentation explicitly notes the social groups whose interests are to be supported and perspectives listened to: the dying and their carers. Whilst there are no social factions who actively oppose these groups of people, aspects of social and economic organisation (the 'mainstream') present barriers to their dignity and welfare.

These NRPs have the natural advantage that they have a very clear set of immediately relevant stakeholders: the group whose integration, emancipation or dignity is to be supported, and organisations that pursue such ends. The notion of advocacy ('taking sides') can facilitate a certain level of trust between the NRP and these stakeholders. However, there is a possibility of encountering political resistance beyond these immediate stakeholder groups. Topics around for instance gender or ethnicity are associated with long political struggles, making this a challenging environment for ensuring workable impact pathways.

Decision support

This model presumes the presence of a debate or conflict of interests, which may need to be solved or settled for a particular aspect of social, cultural or political life to continue and develop. A programme of this type seeks either to solve the dispute, or at least to inject an evidence base into the debate with the aim of moving the debate forward and increasing the likelihood of an evidence-based resolution. Critically, it takes a neutral standpoint in this process.

Whilst 16 of the 17 analysed NRPs fell in equal distribution into the other four archetypes (four each), Only NRP 59 falls into the 'decision support' category. Our evaluation of NRP 59 suggests that 'decision support' may be the most difficult type of programme to execute successfully: creating a neutral position in a potentially highly charged debate is a challenge, as is the task of gaining the trust of either side in the debate. Moreover, our interviews around this programme have suggested that the challenges encountered by NRP 59 may even have discouraged programmes of this type since then.

Acceleration

This is the most straightforward NRP model: an area of science or a set of technologies has been identified as important, and the purpose of the consequent NRP is to strengthen Switzerland's position in the field; in other words, to accelerate Swiss progress to create or cement a position of international leadership. This can happen at different levels: NRP 63 ('Stem cells and regenerative medicine') starts from the premise that Switzerland lags somewhat behind leading countries in this field, and aims to create a stronger skills base and excellent basic research. NRPs 62 and 66 on the other hand acknowledge that Switzerland already has a leading international standing in the fields of interest. The

aim of these two NRPs is to ensure these strengths are commercially exploited, in other words, to accelerate the progression from excellent research to commercialisation. NRP 62 was the first to involve an explicit cooperation with KTI/CTI and an anticipated pathway for some successful NRP projects to receive follow-on funding from KTI/CTI to further develop commercially promising results.

All NRPs in this archetype share a relative absence of engagement with any controversial questions or other normative dimensions: the emphasis is on acceleration of development, not on resolving conflicts or disagreements. This is especially clear in NRP 63, whose subject matter would clearly invite such engagement, but where instead capacity-building is prioritised and ethics and legislation are only noted in the context of ensuring optimised scope for skills and research base development (and only take up a very small share of resources spent).

It should be noted that this NRP archetype, especially when framed in conjunction with KTI/CTI is a more recent phenomenon (NRP 62 was the first to do this). When commenting on the NRP instrument in general, several interviewees for our study voiced concern that NRPs have recently steered more often in this direction, and questioned whether this is in the 'spirit' of the NRP instrument, as the central aim in this archetype tends to be gaining a competitive advantage, rather than addressing societal or political problems.

Steering

This model is based on the premise that an area of science, technology, economy or society is developing on a trajectory that may result in either hazardous or positive scenarios, and that an NRP can help to steer future developments away from the hazardous and towards the positive. There is clearly a normative dimension here, but our analysis finds that these are rarely of a controversial nature: the scenarios that these NRPs set out to help avoid tend to be such that most or all interested parties would agree that they are undesirable, e.g. environmental destruction, exposure to natural disasters, collapse of social cohesion. The aim is to provide research findings and/or to support developments that will help avoid such things.

In terms of impact assessment, NRPs of this type face the inherent problem that its ultimate impacts are the hardest to assess, as the central focus lies on the incidence (or, specifically, the avoidance) of scenarios that may happen in the distant future. Signs of a positive trajectory can of course be highlighted, but the ultimate goal of such programmes may lie too far in the future to be meaningfully monitored and assessed. At the same time, co-development of solutions with practitioners (as practiced in NRP 61) or other forms of implementation support, rather than just outreach and dissemination, are of particular importance here, so that a positive trajectory of development can be facilitated – and evidenced for evaluative purposes.

Orientation

This is the most exploratory and open-ended NRP archetype. Here, the starting point is the identification of a topic, field, technology or social/political/economic development that is deemed to be under-explored, but of high potential relevance to some aspect of Swiss life. Normative aspects (e.g. risks, opportunities, desirable vs. undesirable scenarios, potential political conflicts) are not fully (or not at all) specified at the outset. Coming to a clearer view on such issues is part of the research itself, or may even be ascertained from the end-results of the programme (analogous in some ways to a risk assessment).

This fully open-ended nature, grounded in the need to first engage with a so far under-explored (or fully un-explored) topic is best illustrated by NRP 57 ('Non-ionising radiation'): its documentation explicitly notes that it is unknown, whether non-ionising radiation actually poses any risks at all. Should the research identify such risks, it continues, then risk assessment and prevention will feature in subsequent parts of the programme's research (potentially making it more analogous to the 'steering' model, see above). However, it also notes that it is possible that the research will find this radiation to be risk-free, in which case further deliberation may tend more towards application and development characteristic of the 'acceleration' model (see above).

The especially exploratory nature of this archetype contains a heightened possibility of problems in terms of stakeholder identification and anticipated impacts. The open-ended nature and inherent uncertainty mean that the right stakeholders may be difficult to identify at the start of the programme: depending on what kind of risks or opportunities the research uncovers, different parties may be interested to hear the results, and different kinds of impacts may be worthwhile pursuing. A heightened responsiveness to these issues is therefore likely necessary over the duration of the programme. Key target groups and impact pathways may need re-defining as findings emerge.

B.4 Further points and implications

B.4.1 Determining the archetype

A critical observation that resulted from our analysis is that an NRP's archetype is not determined by its subject-matter. Rather, each NRP develops from its inception a certain self-understanding as a programme ('Programmselbstverständnis'), which is usually traceable, and at times even amplified, in its final summary reports. This self-understanding of a programme must be attributed to the individuals, groups or processes that designed the programme, not to the nature of its subject-matter. To illustrate with some examples:

- NRP 63 "Stammzellen und regenerative Medizin" could have opted to focus more on the controversial political and ethical debates about stem cell use and proposed to move this debate forward, which would have given it a 'decision support' archetype. However, throughout the documentation, it is focused on the desire to expand the Swiss research strength and overall capacity in this field in order to compete (academically and practically) with the leading countries in the field of stem cell research and use. Legal and ethical aspects are noted almost exclusively in the context of optimising the legal landscape to ensure development of the field. In short: though a very different archetype would have been possible with this topic, the chosen path is the 'Acceleration' model
- NRP 67 "Lebensende" could have taken the shape of an open-ended 'Orientation'. However, the documentation sets out that it focusses on the needs, wishes and welfare of certain groups (in this case, the dying, their relatives and their carers), and at one point even contrasts this against a use- and efficiency-driven mainstream society, giving the programme a clear 'Advocacy' archetype

Different NRP topics may of course lend themselves more to some archetypes and less to others. Nevertheless, in many cases there will be a genuine choice of how a programme positions itself in relation to its topic of interest. The creation of each NRP is subject to input from many different social, political and scientific institutions and perspectives, so there is no 'right' and 'wrong' here from an evaluative standpoint.

B.4.2 Characteristics and implications

Our wider analysis here, as well as our specific analysis of NRPs 59, 60 and 61, show that each archetype brings with it certain opportunities and challenges that ought to be considered. We summarise in the table below some basic features of the different archetypes:

Table 21: NRP archetypes - overview

Arche-type	Likely disciplinary focus	Likelihood of political controversy	Stakeholder groups	Main impact aim	Main challenges
Advocacy	Social science	High	Immediate stakeholders: clearly identifiable; wider stakeholder groups: less so	Improved inclusion/equality/dignity for the group(s) in question	• Ensuring transition from outreach/exchange with the affected group and associated organisations to wider stakeholders capable of implementing changes • Potential of political resistance • Questioning of legitimacy / scientific impartiality

Arche-type	Likely disciplinary focus	Likelihood of political controversy	Stakeholder groups	Main impact aim	Main challenges
Decision support	mixed	Almost certain	Clearly identifiable (parties involved in the decision)	Solution or improved debate on the decision-making process	• Securing trust from all sides involved in the decision • Operating in potentially charged political environment • Ensuring different perspectives can operate together within the NRP
Acceler-ation	Natural science (mostly applied)	Absent or disregarded	Clearly identifiable (industries/ other groups interested in the technology)	New products or strengthened industry/field of science	• Focus may remain limited to capacity building or commercialisation; potentially low relevance to social, political or economic problems • Dilution of separation between NRP and KTI/CTI/BRIDGE
Steering	Mixed	Low	Clearly identifiable (industries/ other sectors to be steered)	Avoidance of undesirable scenarios / achievement of positive scenarios	• Impact may be the absence rather than the presence of something; long time horizon additionally means the final impact may be impossible to assess
Orient-ation	Mixed	Unknown	Unclear / might change over the NRP's course	Unclear	• Key stakeholder groups and the type of outcomes and impacts may be subject to change, given the open-ended nature of these most exploratory NRPs

Some of the challenges associated with the different archetypes can be anticipated and considered at the programme design stage. Based on our short analysis, it is possible to highlight some considerations that ought to be made for each of the five archetypes.

Archetype	Programme design considerations
Advocacy	Beyond immediate stakeholders and 'multipliers', assess whether there are any links to decision-makers that could be strengthened from the programme start. Do either researchers or the immediate stakeholders/multipliers have the ability to facilitate a progression from dissemination to impact?
Decision support	Prior assessment of whether an independent science base is likely to be 'heard' in a politically charged environment. Can anything be done to ensure trust and 'buy-in' from all sides of the decision-making process?
Acceleration	Is there any potential dilution of boundaries between the NRP instrument and other instruments (e.g. KTI/CTI, early career researcher support programmes)? Is the NRP remit of addressing social, political or economic problems in a research-based way fulfilled?
Steering	Where long-term impacts cannot be measured, how will markers of intermediate impact be defined? What might be signs that a positive 'trajectory' has been achieved? Co-creation or implementation of developed practices may be especially important here.
Orientation	How will the programme maintain its coherence with regard to stakeholders and anticipated impacts? It may be necessary to plan for incremental revisions of who the main stakeholders are and what kind of outputs, outcomes and impacts follow from the NRP's findings. Setting aside time and budget for such revisions might be necessary.

B.4.3 Overview of NRPs analysed for this section

Table 22: NRPs 50-67 – an overview of programme archetypes

NRP	Start / budget	Archetype	Details
NFP 50 "Hormonaktive Stoffe: Bedeutung für Menschen, Tiere und Ökosysteme"	Jan 2002 (Forschungs-beginn) CHF 15 Mio	**STEERING**	Mostly focussed on understanding risks of hormone-based chemicals in the environment and planning to manage risks and control these things in future. Stakeholder involvement happened through three expert groups, so research and practice were at first separate, then came together.
NFP 51 "Integration und Ausschluss"	Apr 2003 (Forschungs-beginn) CHF 12 Mio	**ADVOCACY**	Looks at all kinds of excluded groups and successes/failures around integration & exclusion. Aim: less exclusion, without misguided integration attempts.
NFP 52 "Kindheit, Jugend und Generationenbeziehungen im gesellschaftlichen Wandel"	Apr 2003 (Forschungs-beginn) CHF 12 Mio	**ORIENTATION**	Assesses youth and generational relations in CH, provides evidence and possibilities for optimised policymaking to suit the modern state of affairs.
NFP 53 "Muskuloskelettale Gesundheit – Chronische Schmerzen"	Apr 2004 (Forschungs-beginn) CHF 12 Mio	**ACCELERATION**	Seeks to better understand causes of muscle-skeletal ailments, formulate optimised ways to deal with this at all level, including prevention through e.g. workplace rules.
NFP 54 "Nachhaltige Siedlungs- und Infrastrukturentwicklung"	Sommer 2005 (Forschungs-beginn) CHF 13 Mio	**STEERING**	Ensure principles of sustainability are integrated into various elements of infrastructure and housing.
NFP 56 "Sprachenvielfalt und Sprachkompetenz in der Schweiz"	Sep 2005 (Forschungs-beginn) CHF 8 Mio	**STEERING**	Understand and advise on how the 'language peace' in CH can be strengthened and ensured going forward (policy and practice), especially in the context of a changed world: immigrants, the rise of English, changed job needs, closer integrated regions.
NFP 57 "Nichtionisierende Strahlung – Umwelt und Gesundheit"	Von 2006 (Forschungs-beginn) CHF 5 Mio	**ORIENTATION**	Assessing the effects of non-ionised radiation on biological systems (people/animals), to firstly ascertain whether there are any effects at all (if not, calm the public!), or, if yes, to detail risks and suggest mitigation approaches.
NFP 58 "Religionsgemeinschaften, Staat und Gesellschaft"	Sep 2006 (Projektskizzen) CHF 10 Mio	**ADVOCACY**	Assessing the multitude of religious life in CH and relationships between faith, identity and state. Looks to see how to manage both secularisation and de-secularisation and diversity. Individuals' self-understanding around their faith and how it is portrayed and/or clashes with various areas of public life are central. The 'Minarett-streit' happened someway through this NRP...which affected the NRP somewhat.
NFP 59 "Nutzen und Risiken der Freisetzung gentechnisch veränderter Pflanzen"	Aug 2006 (Projektskizzen) CHF 12 Mio	**DECISION SUPPORT**	Aims to create an evidence base from a neutral scientific standpoint that can support political decisions on GM in Switzerland, especially in relation to risks and opportunities. A central aim is to inform the on-going political debate on the GM moratorium in Switzerland.
NFP 60 "Gleichstellung der Geschlechter"	Mai 2009 (Ausschreibung) CHF 8 Mio	**ADVOCACY**	Notes the lack of progress towards gender equality in Switzerland, despite the now long-standing equality law. Aims to evaluate existing policies and formulate more fruitful approaches to achieving greater levels of gender equality. The interplay between inequalities at different stages of the life course is a central structuring component of the programme.
NFP 61 "Nachhaltige Wassernutzung"	Okt 2008 (Ausschreibung) CHF 12 Mio	**STEERING**	Aims to set the Water management and water supply sector in Switzerland onto a more sustainable path in order to prevent possible future problems with respects to the effects of climate change and the risk of natural disasters. Through co-creating solutions with practitioners, a path of sustainable development of the sector onto a positive trajectory to minimise risks is anticipated.

NRP	Start / budget	Archetype	Details
NFP 62 "Intelligente Materialien"	Nov 2008 (Ausschreibung) CHF 11 Mio	**ACCELERATION**	With KTI (the first time this was done!) Phase 1: research, phase 2: continuation of project with likely application, phase 3: KTI funding call. No basic research, but has a 'high risk-high reward' dimension for a share of projects. The focus is seizing new opportunities in the field of intelligent materials, getting ahead of other countries and exploiting economic opportunities.
NFP 63 "Stammzellen und regenerative Medizin"	Feb 2009 (Ausschreibung) CHF 10 Mio	**ACCELERATION**	Bring CH up to speed on stem cell research. Mostly basic research, only vague pathways to commercialisation intended. Strong emphasis on training young researchers in this area to ensure a future skill base. Some plans around policy and ethical issues too, but framed very much in a 'development' context as well, i.e. optimising the law/policy so that research strength can be enhanced.
NFP 64 "Chancen und Risiken von Nanomaterialien"	Herbst 2009 (Ausschreibung) CHF 12 Mio	**ORIENTATION**	Appraise both benefits (incl. economic) and the risks of nanomaterials, especially in terms of unforeseen interaction with humans. The programme has an element of direct commercialisation plans.
NFP 65 "Neue urbane Qualität"	Jul 2009 (Ausschreibung) CHF 5 Mio	**ORIENTATION**	Develop new concepts/ideas around urban planning. The documentation highlights problems around loss of 'soul' & sensibility in urban planning and the need to work out ways of doing things better. However, the (only) 5 projects funded in detail all appear to have developed quite specific techniques, approaches and plans. It may therefore be classed as 'acceleration', but doing so would ignore the real engagement with potential problems and future scenarios.
NFP 66 "Ressource Holz"	Dez 2010 (Ausschreibung) CHF 18 Mio	**ACCELERATION**	With KTI! (second time after NRP 62). Aims to devise ways of creating a more profitable wood-based industry, including in relation to supply and 'cascade' chains. There are some nods to sustainability, but these are rare and very much in the background compared to commercial dimensions. Proposes to fund a small number of 'high risk high reward' projects. Generally, the NRP reads VERY similarly to NRP 62.
NFP 67 "Lebensende"	Feb 2011 (Ausschreibung) CHF 15 Mio	**ADVOCACY**	Strong focus on the wishes and the needs of the dying, in all contexts. Pehaps the hardest to classify, but advocacy and the opposition to a 'mainstream' is most clearly demonstrable in the synthesis report: *"Sie verweisen ferner auf die Bedeutung zentraler Grundhaltungen wie Selbstbestimmung, Lebensqualität bis zuletzt und die Berücksichtigung des Menschen mit all seinen Bedürfnissen. Diese Werte und die entsprechenden Haltungen und Angebote stehen im Gegensatz zu einer von Fragmentierung und Fremdbestimmung geprägten nutzenorientierten Gesellschaft."*

Appendix C Methodological details

C.1 Document review

Our document review for this study included appraisal of past evaluations of NRPs. These include:

- BBW: Begutachtung der Nationalen Forschungsprogramme (NFP). Bericht der Expertenkommission an das Bundesamt für Bildung und Wissenschaft, Bern 1994
- SBF: Wirkungsprüfung: Nationale Forschungsprogramme. Studie geführt von CEST. Staatssekretariat für Bildung und Forschung: Bern 2007
- We also studied a small sample of the 'Radar Berichte' that were conducted for previous NRPs

However, the main part of our document review focussed on the documentation for each of the three NRPs. These were made available to us by the SNSF. These documents include, for each NRP:

- Annual reports for every year of the NRP's duration
- Feasibility study
- Final reports of each project funded by the NRP
- Minutes of steering committee meetings
- Programme synthesis reports
- Reports outlining the KT concept
- Selected annexes and responses to the annual reports
- The demand analysis ('Bedarfsanalyse')
- The execution plan ('Ausführungsplan')
- The final report for the programme (financial)
- The final report for the programme (topical)
- The proposal programme and application(s) on which the NRP is based

This list is non-exhaustive. Further selected documents were supplied in relation to each NRP. Much of the evidence presented in this report draws on findings based in part on reviewing these documents.

The document review was structured through an extended set of questions that follows a generic programme logic (aims / inputs / activities / outputs / impacts). The available documentation was used to compile answers to as many questions as possible and in as much detail as possible, so that the following primary data collection phases could be designed efficiently and without duplicating efforts.

Starting point/ creation of the NRP and background

- What are the problems the NRP is intended to address?
- In how much detail are these described? Is there an evidence base that is used to describe them?
- Who are the parties involved in suggesting, agreeing on, and operationalising the NRP?
- Is there any evidence of disagreement or conflict at the outset over what shape the NRP should take?

Aim(s)

- What were the a priori aims of the NRP?
- In how much detail are these defined?

- Are any indicators or 'measures' of success stated at the outset that could be retrospectively used to gauge success against the aims?
- Is it clear who exactly set these aims and how they were decided upon?

Knowledge transfer concept

- Is there a KT concept? (there should be!)
- How detailed is it? What does it involve?
- Are there certain anticipated outputs that were supposed to be created?
- Are eventual target 'audiences' defined? How well are they defined?
- Is there prior connection to these audiences? Are they intended to be somehow involved in the NRP itself? Is it more a sense of co-design/collaboration/coproduction throughout, or of producing results and then giving them to the audiences?
- A knowledge transfer concept should be present at programme-level, but is there any information about KT-concepts at project level?

Inputs

- How many projects are funded under the NRP? How many applied for a project (i.e. was there big demand?)? what kind of institutions/ disciplines are represented in those projects? What do we know about how the projects were selected (people involved, criteria)?
- Duration of the NRP?
- What financial resources were put in place?
- What does the programme level look like? How many people, who, from where?
- Is there a clear sense of division of labour? Who is supposed to be responsible for what?
- In particular: were there clear designations of responsibility around knowledge synthesis and transfer, communication with stakeholders, publicity, etc?

Activities

- What went on during the period of the NRP?
- What do we know about day-to-day interactions between project and programme level?
- Are there certain projects that come up a lot and seem to have been active on the 'impact' side of things?
- Was there any production of outputs at the programme level?
- Were there external communication activities, either at project or at programme level?
- Any seminars/ talks/ press releases/conferences/ workshops/ training activities/ other comm's activities?

Outputs

Academic

- What were the academic outputs, mainly at project level, but also at programme level where applicable?

- Is there a sense whether productivity is overall satisfactory?
- Are there strong and/or weak areas?

Non-academic

- What outputs were generated that are supposed to pertain directly to achieving impact (esp. non-academic impact?
- Were non-academic outputs or outputs aimed specifically at achieving non-academic impact generated? Project or programme level? Or was there visible interaction between the two (co-creation)?

Impacts

Non-academic impacts

- Are there any known non-academic impacts that have resulted from the NRP?
- Is there evidence to show these are directly attributable to the NRP itself, or were other factors at play?
- Are there areas where impacts have not yet materialised, though there is a good chance that they might [e.g. policy change being considered, final decisions pending, visible change in on-going debates, etc]

Academic impacts

- Can we say anything about the academic impact of the NRP? [bibliometrics will take care of a part of this, but if there is qualitative information on this, it would also be helpful. In some disciplines bibliometrics don't count for much, so we'd want to see, for instance, whether any of the projects led to further funding on related thematic areas, academic prizes, creation of new long-term research groups, special journal issues, etc]

Pathways to impact

- How were non-academic impacts achieved, or how are emerging impacts being achieved?
- Who are the various groups, 'transmission channels', or intermediary organisations involved?
- How far did programme- or project-level individuals form the NRP stay involved in realisation of impacts?
- To what extent do the processes of impact-generation still reflect the original knowledge-transfer concept? In other words, was the KT-concept implemented as planned or did things deviate?
- To what extent were programme- and project-level individuals involved in generating non-academic impacts? Did the programme-level simply 'feed' off the knowledge created by the projects, or were all or some projects involved in any 'pathways' to impact?

C.2 Interview details

C.2.1 List of interviewees

NRP 59 – Risks and benefits of GM plants

Interviewees - Programme level

Table 23: Programme level interviews for NRP 59

Name	Role in NRP	Position / organisation	Interviewer	Interview
Beat Glogger	KT manager	Wissenschaftsjournalist Scitec-Media, Agentur für Wissenschaftskommunikation,	Maike Rentel	17/10/2017 0730-0815 (UK)
Daniel Schümperli	Member of steering committee	Professor Emeritus Institut für Zellbiologie, Universität Bern	Maike Rentel	28/09/2017 1300-1400 (UK)
Detlef Bartsch	Member of steering committee	Leiter der Abteilung Gentechnik Bundesamt für Verbraucherschutz und Lebensmittelsicherheit (BVL) Berlin	Maike Rentel	12/10/2017 1000–1055 (UK)
Hans Hosbach	Federal Representative	Ehemaliger Chef Sektion Biotechnologie und Stoffflüsse Bundesamt für Umwelt BAFU, Bern	Maike Rentel	24/10/2017 1030-1130 (UK)
Jeremy B. Sweet	Member of steering committee	Umwelt- und Forschungsberater, Cambridge, UK	Maike Rentel	28/10/2017 1100-1140 (UK)
Joachim Scholderer	Member of steering committee	Professur Abteilung für Marketing und Statistik, Aarhus School of Business	Maike Rentel	29/09/2017 1330-1430 (UK)
Josef Zeyer	Member of steering committee	Professor Emeritus Institut für terrestrische Ökologie, ETH Zürich	Maike Rentel	16/10/2017 1000-1050 (UK)
Karoline Dorsch	Member of steering committee	Ehemaliges Mitglied Eidgenössische Fachkommission für biologische Sicherheit, Ittigen	Maike Rentel	10/10/2017 1300-1350 (UK)
Pascal Walther	Programme coordinator (from December 2011)	SNSF	Maike Rentel	19/10/2017 1230-1330 (UK)
Stefan Husi	Programme coordinator (until December 2011)	SNSF	Maike Rentel	19/10/2017 1230-1330 (UK)
Thomas Bernauer	Delegate of the SNSF	Professur Zentrum für Vergleichende und Internationale Studien (CIS), ETH Zürich	Maike Rentel	09/10/2017 1300-1355 (UK)

Interviewees – Wider stakeholders

Table 24: Wider stakeholder interviews for NRP 59

Interviewee	Position / organisation	Interviewer	Interview date / time
Anne-Gabrielle Wuest Saucy	Abteilungsleiterin Biotechnologie Bundesamt für Umwelt BAFU, Bern	Maike Rentel	20/11/2017 1245-1315 (UK)
Ariane Willemsen	Geschäftsführerin Eidgenössische Ethikkommission für die Biotechnologie im Ausserhumanbereich (EKAH), Bern	Maike Rentel	20/11/2017 1200-1230 (UK)
Isabel Hunger-Glaser	Geschäftsführerin Eidgenössische Fachkommission für biologische Sicherheit (EFBS), Bern	Maike Rentel	13/11/2017 1430-1500 (UK)
Jan Lucht	Projektmanager Biotechnologie und Landwirtschaft Scienceindustries (Wirtschaftsverband Chemie Pharma Biotech)	Maike Rentel	08/11/2017 1430-1500 (UK)
Luigi D'Andrea	Secrétaire exécutif L'Alliance suisse pour une agriculture sans génie génétique (StopOGM), Neuchâtel	Adam Krcal	15/11/2017 1100-1130 (UK)
Sara Stalder	Geschäftsführerin Stiftung fuer Konsumentenschutz, Bern	Maike Rentel	13/11/2017 1300-1325 (UK)

NRP 60 – Gender equality

Interviewees - Programme level

Table 25: Programme level interviews for NRP 60

Interviewee	Role in NRP	Position / organisation	Interviewer	Interview date / time
Alexander Grob	Delegate of the SNSF	Abteilungsleiter Fakultät für Psychologie, Universität Basel	Peter Kolarz	29/09/2017 0850-0935 (UK)
Alfonso Sousa-Poza	Member of steering committee	Lehrstuhl für Haushalts-, Konsum- und Genderökonomie Universität Hohenheim (Stuttgart) Privatdozent an der volkswirtschaftlichen Abteilung der Universität St. Gallen	Peter Kolarz	12/10/2017 0900-1000 (UK)
Birgit Sauer	Member of steering committee	Professur für Politikwissenschaft Institut für Politikwissenschaft, Universität Wien	Peter Kolarz	14/11/2017 1600-1645 (UK)
Brigitte Liebig	President of steering committee	Hochschule für Angewandte Psychologie, Fachhochschule Nordwestschweiz	Peter Kolarz	12/10/2017 1400-1525 (UK)
Frauke Sassnick Spohn	KT Manager (from 2013)	Büro für Soziales, Bildung und Gesundheit, Sassnick Spohn GmbH, Winterthur	Peter Kolarz	24/10/2017 0900-0950 (UK)

Interviewee	Role in NRP	Position / organisation	Interviewer	Interview date / time
Karin Gottschall	Member of steering committee	Professur Zentrum für Sozialpolitik, Universität Bremen	Peter Kolarz	12/10/2017 1630-1720 (UK)
Lucien Criblez	Member of steering committee	Professor für Historische Bildungsforschung und Steuerung des Bildungssystems Pädagogisches Institut, Universität Zürich	Peter Kolarz	11/10/2017 1500-1600 (UK)
Rene Levy	Member of steering committee	Professor Emeritus Faculté des sciences sociales et politiques, Institute of Social Sciences, University of Lausanne	Peter Kolarz	20/09/2017 1000-1120 (UK)
Stephanie Schönholzer	Programme coordinator	SNSF	Peter Kolarz	26/10/2017 1000-1115 (UK)
Sylvie Durrer	Federal Representative	Direktorin Eidgenössisches Büro für die Gleichstellung von Frau und Mann (EBG)	Adam Krcal	28/09/2017 1300-1345 (UK)

Interviewees – Wider stakeholders

Table 26: Wider stakeholder interviews for NRP 60

Interviewee	Position / organisation	Interviewer	Interview date / time
Anja Derungs	Gleichstellungsbeauftragte Stadt Zürich	Peter Kolarz	15/11/2017 1300-1330 (UK)
Claudia Weilenmann	Wissenschaftliche Mitarbeiterin EKF – Eidgenössische Kommission für Frauenfragen	Peter Kolarz	27/11/2017 1500-1535 (UK)
Corinne Päper	Redaktion HR Today	Peter Kolarz	21/11/2017 1400-1425 (UK)
Helena Trachsel	Gleichstellungsbeauftragte Kanton Zürich	Peter Kolarz	10/11/2017 1000-1035 (UK)
Lucrezia Meier-Schatz	Direktorin (ehem.) ProFamilia	Peter Kolarz	11/12/2017 0800-0830 (UK)
Markus Zürcher	Generalsekretär Schweizerische Akademie der Geistes- und Sozialwissenschaften SAGW	Peter Kolarz	15/11/2017 0730-0800 (UK)
Regula Bühlmann	Zentralsekretärin Schweizer Gewerkschaftsbund	Peter Kolarz	28/11/2017 1000-1025 (UK)
Vera Husfeldt	Leiterin Abteilung Qualitätsentwicklung	Peter Kolarz	29/11/2017

Interviewee	Position / organisation	Interviewer	Interview date / time
	Schweizerische Konferenz der Kantonalen Erziehungsdirektoren (EDK)		1300-1320 (UK)
Yvonne Feri	Nationalrätin Nationalrat / Sozialdemokratische Partei der Schweiz (SP)	Peter Kolarz	30/11/2017 1010-1030 (UK)

NRP 61 – Sustainable water management

Interviewees - Programme level

Table 27: Programme level interviews for NRP 61

Interviewee	Role in NRP	Position / organisation	Interviewer	Interview date / time
Barbara Flückiger Schwarzenbach	Programme coordinator	SNSF	Helmut Fryges	20/10/2017 1000-1100 (GER)
Bernd Hansjürgens	Member of the steering committee (responsible for Synthesis 4)	Fachbereich Sozialwissenschaftliche Umweltforschung, Departement Ökonomie, Helmholtz Zentrum für Umweltforschung UFZ, Leipzig	Helmut Fryges	27/10/2017 1100-1150 (GER)
Christian Leibundgut	President of the steering committee	Institut für Hydrologie IHF, Universität Freiburg i.Br	Helmut Fryges	15/11/2017 1600-1700 (GER)
Christoph Böbner	Member of the steering committee	Leiter Dienststelle für Landwirtschaft und Wald, Kanton Luzern	Helmut Fryges	24/10/2017 1700-1740 (GER)
Janet Hering	Project Coordinator “Methods of interdisciplinary and transdisciplinary knowledge integration in the NRP 61 synthesis process	Director of EAWAG: Swiss Federal Institute of Aquatic Science and Technology	Helmut Fryges	27/10/2017 1400-1450 (GER
Martin Würsten	Member of the steering committee	Leiter Amt für Umwelt, Kanton Solothurn	Helmut Fryges	06/11/2017 1400-1455 (GER)
Nina Buchmann	Delegate of the SNSF	ETH Zürich	Helmut Fryges	27/10/2017 0800-0830 (GER)
Patricia Fry	KT Manager	Wissensmanagement Umwelt GmbH, Zürich	Helmut Fryges	03/11/2017 1400-1510 (GER)
Pierre Walther	‘Mandat Gesamtsynthese’	fast4meter	Helmut Fryges	17/10/2017 1430-1525 (GER)
Stephan Müller	Federal Representative	Direktor der Abteilung Wasser, Bundesamt für Umwelt BAFU, Bern	Helmut Fryges	18/10/2017 1300-1350 (GER)

Interviewees – Wider stakeholders

Table 28: Wider stakeholder interviews for NRP 61

Interviewee	Position / organisation	Interviewer	Interview date / time
Bettina Koster	AGRIDEA	Helmut Fryges	12/12/2017 1600-1630 (GER)
Eric Mennel	Sektionschef Gewässerschutz Amt für Umwelt des Kantons Freiburg	Adam Krcal	27/11/2017 1500-1600 (UK)
Ernst Meili	Technischer Leiter Wasserversorgung Egg	Helmut Fryges	19/12/2017 1330-1400 (GER)
Felix Luder	Farmer	Helmut Fryges	28/11/2017 1900-1930 (GER)
Urs Andereggen	Departement für Volkswirtschaft und Bildung Dienststelle für Landwirtschaft Amt für Strukturverbesserungen Kanton Wallis	Helmut Fryges	27/11/2017 1800-1830 (UK)

C.3 Survey response rates

As part of our study, we conducted a survey of principal investigators (PIs) of all projects funded under NRPs 59, 60 and 61 (excluding steering group members who only led minor synthesis projects). With the help of the SNSF, we were able to send out invitations to 65 valid e-mail addresses, which covers almost the entire population (a very small number of PIs are known to be deceased or are no longer searchable).

With this small target population, statistical significance is impossible to calculate meaningfully, so we opted to get as close as possible to a 'census' (i.e. reaching all possible respondents). After an initial invitation and three reminders, we have 48 complete responses, on which the results presented in this report are based. Three individuals have opted out of online surveys (they may already have done so prior to this study) and therefore cannot be reached. Additionally, a small number may have retired and no longer use their e-mail address or may simply be unwilling to respond to messages pertaining to their past career (although we have received some responses from retirees).

Our response rate is 74%, or 77% if we exclude those who opted out. Further, we find that our response pool is fairly representative of the target population in terms of gender, institution type and PI's main associated SNSF division. ETHZ is slightly under-represented and institutions other than ETHZ and universities are slightly overrepresented. Further, representation of each NRP increases chronologically: NRP 59 has the lowest response rate, likely owing to the fact that it lies longer in the past and there may be more current retirees in the NRP 59 population.

Table 29: Survey of PIs – response and representation rates

RESPONSE RATES	Total numbers	responses	opt-outs	Response rate (raw)	Response rate (excl. opt-outs)
NRP 59	26	18	1	69%	72%
NRP 60	21	16	2	76%	84%
NRP 61	18	14	0	78%	78%
Total	**65**	**48**	**3**	**74%**	**77%**

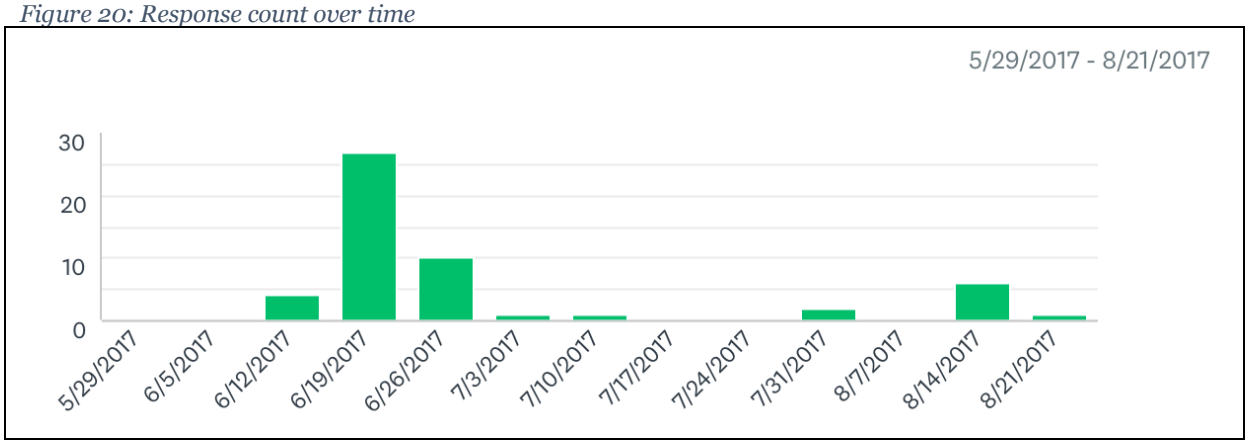
REPRESENTATION: GENDER	Gender: population	Gender: responses	Gender: response rates
Male	47	35	74%
Female	18	13	72%

REPRESENTATION: INSTITUTION TYPE	Inst. type: population	Inst. type: responses	Inst. type: response rates
ETH-bereich	10	5	50%
University	30	22	73%
Other	25	21	84%

REPRESENTATION: SNSF DIVISION	Division: population	Division: responses	Division: response rates
Division 1	33	26	79%
Division 2	15	11	73%
Division 3	17	11	65%

The survey remained open from June until October 2017. The response count over time is shown below.

Figure 20: Response count over time



Appendix D Additional data

D.1 Productivity: comparing output numbers

Next to our field-adjusted bibliometric analysis, we also present at various points in this report the raw numerical data on how many outputs were created by the NRPs. Direct comparison between the three programmes would be problematic: their disciplinary compositions are different, and publication patterns vary between disciplines. Nevertheless, in order to assess whether scientific productivity is satisfactory, we can provide some figures to help contextualise the amount (note: not the quality or impact) of what was produced.

For the NRPs, we have our survey results from each NRP's project PIs. As a comparator, we can use the results of a similar (but much larger) survey conducted as part of the evaluation of use-inspired basic research at SNSF (2016/17).[52]

Table 30: Output numbers compared

	NRP 59/60/61 total	**NRP 59**	**NRP 60**	**NRP 61**	**SNSF grants (2011-15) Excluding 'use-inspired'**	**SNSF grants (2011-15) 'use-inspired' only**
Median number of academic journal articles per project	5.0	3.0	3.5	7.5	5.0	3.0
Median number of academic talks per project	8.0	5.0	10.0	10.0	8.0	5.0
Source	Survey of NRP 59, 60 and 61 PIs conducted as part of this study				Survey of PIs of SNSF mainstream funded projects, conducted as part of the evaluation of use-inspired basic research at SNSF[53]	

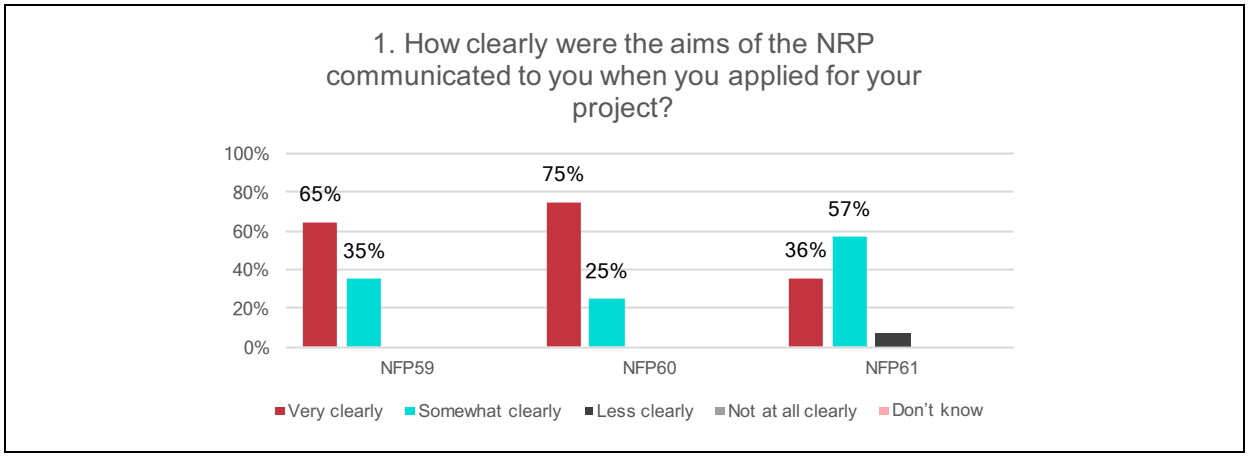
[52] Survey data available in the Annex: http://www.snf.ch/SiteCollectionDocuments/SNSF_UIBR_Appendices_to_Final_Report_by_Technopolis_May2017.pdf

[53] Ibid.

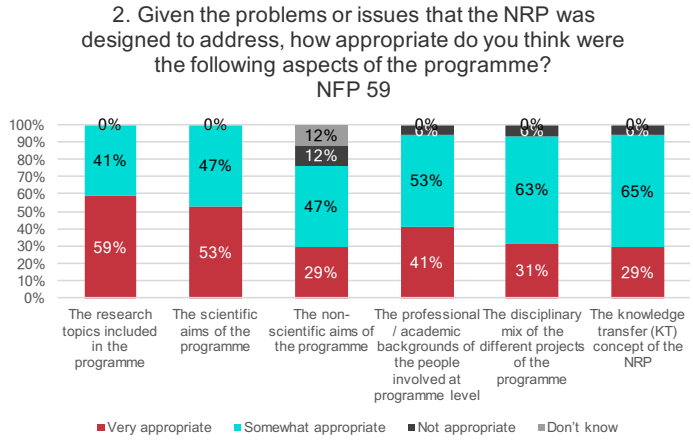
D.2 Survey results

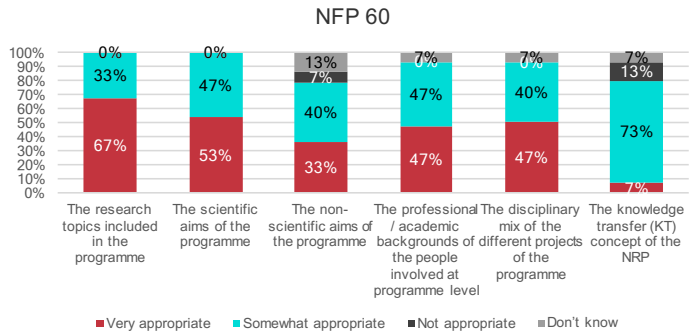
Here we present the full raw data of our survey results. The responses here are aggregated totals, so they do not highlight the differences between the three NRPs, which are at times significant.

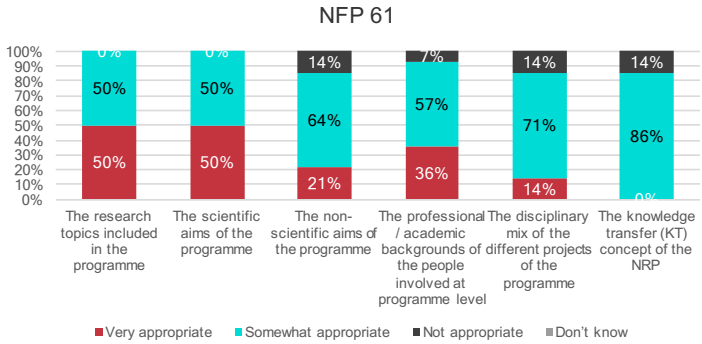
1. How clearly were the aims of the NRP communicated to you when you applied for your project?
Very clearly
60%
Somewhat clearly
38%
Less clearly
2%
Not at all clearly
0%
Don't know
0%



2. Given the problems or issues that the NRP was designed to address, how appropriate do you think were the following aspects of the programme?					
The research topics included in the programme	The scientific aims of the programme	The non-scientific aims of the programme	The professional / academic backgrounds of the people involved at programme level	The disciplinary mix of the different projects of the programme	The knowledge transfer (KT) concept of the NRP
Very appropriate	Very appropriate	Very appropriate	Very appropriate	Very appropriate	Very appropriate
59%	52%	28%	41%	31%	13%
Somewhat appropriate	Somewhat appropriate	Somewhat appropriate	Somewhat appropriate	Somewhat appropriate	Somewhat appropriate
41%	48%	50%	52%	58%	74%
Not appropriate	Not appropriate	Not appropriate	Not appropriate	Not appropriate	Not appropriate
0%	0%	11%	4%	7%	11%
Don't know	Don't know	Don't know	Don't know	Don't know	Don't know
0%	0%	9%	2%	2%	2%
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
0%	0%	2%	0%	2%	0%

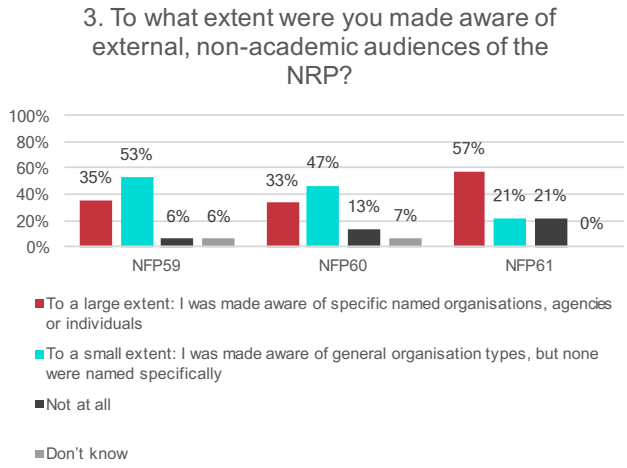


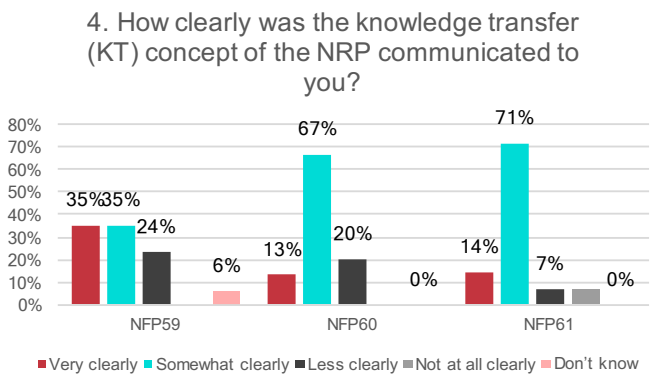


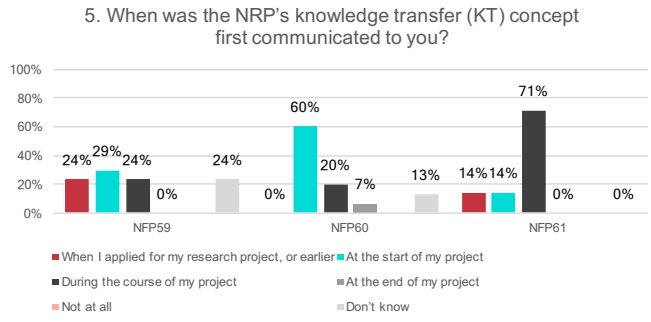


3. To what extent were you made aware of external, non-academic audiences of the NRP?	**4. How clearly was the knowledge transfer (KT) concept of the NRP communicated to you?**	**5. When was the NRP's knowledge transfer (KT) concept first communicated to you?**
To a large extent: I was made aware of specific named organisations, agencies or individuals	Very clearly	Not at all
41%	22%	0%
To a small extent: I was made aware of general organisation types, but none were named specifically	Somewhat clearly	When I applied for my research project, or earlier
41%	57%	13%
Not at all	Less clearly	At the start of my project
13%	17%	35%
Don't know	Not at all clearly	During the course of my project
4%	2%	37%
	Don't know	At the end of my project

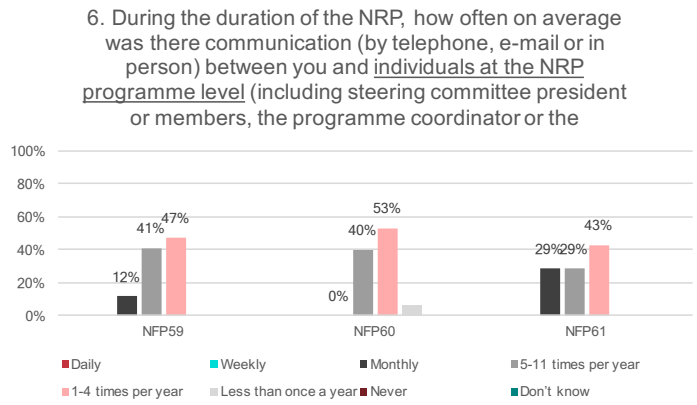
	2%	2%
		Don't know
		13%

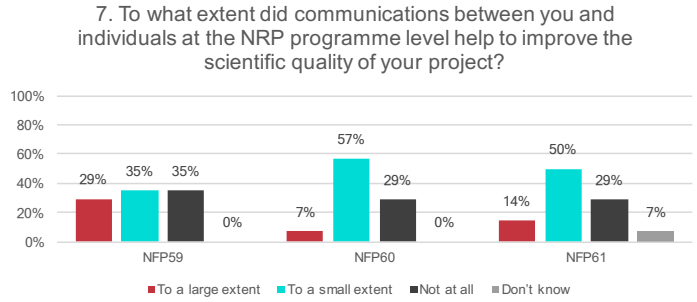


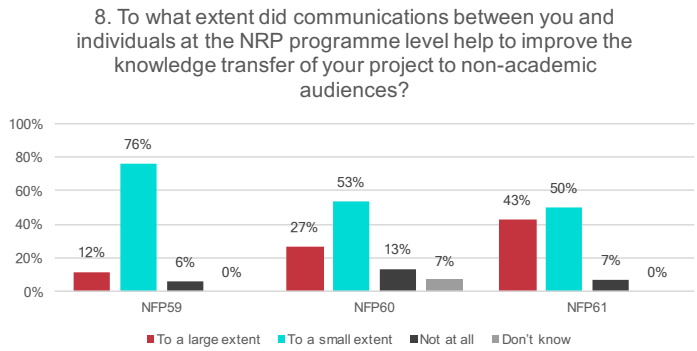




6. During the duration of the NRP, how often on average was there communication (by telephone, e-mail or in person) between you and individuals at the NRP programme level (including steering committee president or members, the programme coordinator or the KT manager)? Please estimate as closely as you can.	7. To what extent did communications between you and individuals at the NRP programme level help to improve the scientific quality of your project?	8. To what extent did communications between you and individuals at the NRP programme level help to improve the knowledge transfer of your project to non-academic audiences?
Daily	To a large extent	To a large extent
0%	18%	26%
Weekly	To a small extent	To a small extent
0%	47%	61%
Monthly	Not at all	Not at all
13%	31%	9%
5-11 times per year	Don't know	Don't know
37%	2%	2%
1-4 times per year	Not applicable	Not applicable
48%	2%	2%
Less than once a year		
2%		
Never		
0%		
Don't know		
0%		



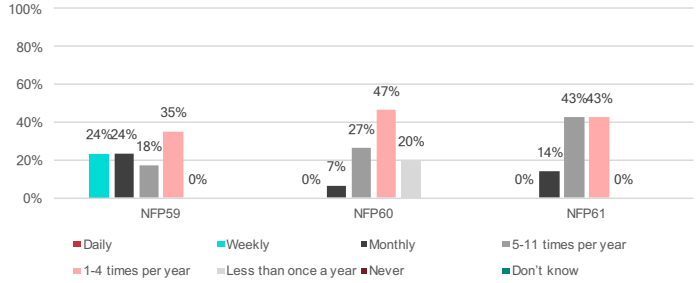




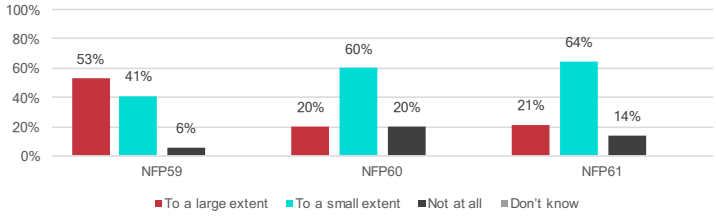
9. During the duration of the NRP, how often on average was there communication between you and investigators from other projects within your NRP (by telephone, e-mail or in person)? Please estimate as closely as you can.	**10. To what extent did communications between you and investigators from other projects help to improve the scientific quality of your project?**	**11. To what extent did communications between you and investigators from other projects help to improve the knowledge transfer of your project to non-academic audiences?**
Daily	To a large extent	To a large extent
0%	33%	17%
Weekly	To a small extent	To a small extent
9%	54%	48%
Monthly	Not at all	Not at all
15%	13%	28%
5-11 times per year	Don't know	Don't know
28%	0%	4%
1-4 times per year	Not applicable	Not applicable

41%	0%	2%
Less than once a year		
7%		
Never		
0%		
Don't know		
0%		

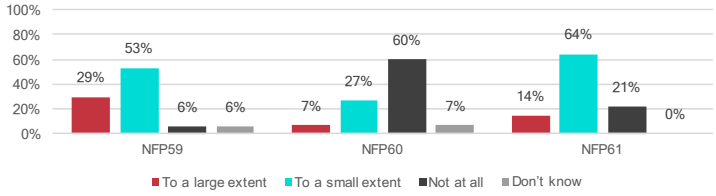
9. During the duration of the NRP, how often on average was there communication between you and investigators from other projects within your NRP (by telephone, e-mail or in person)? Please estimate as closely as you can.



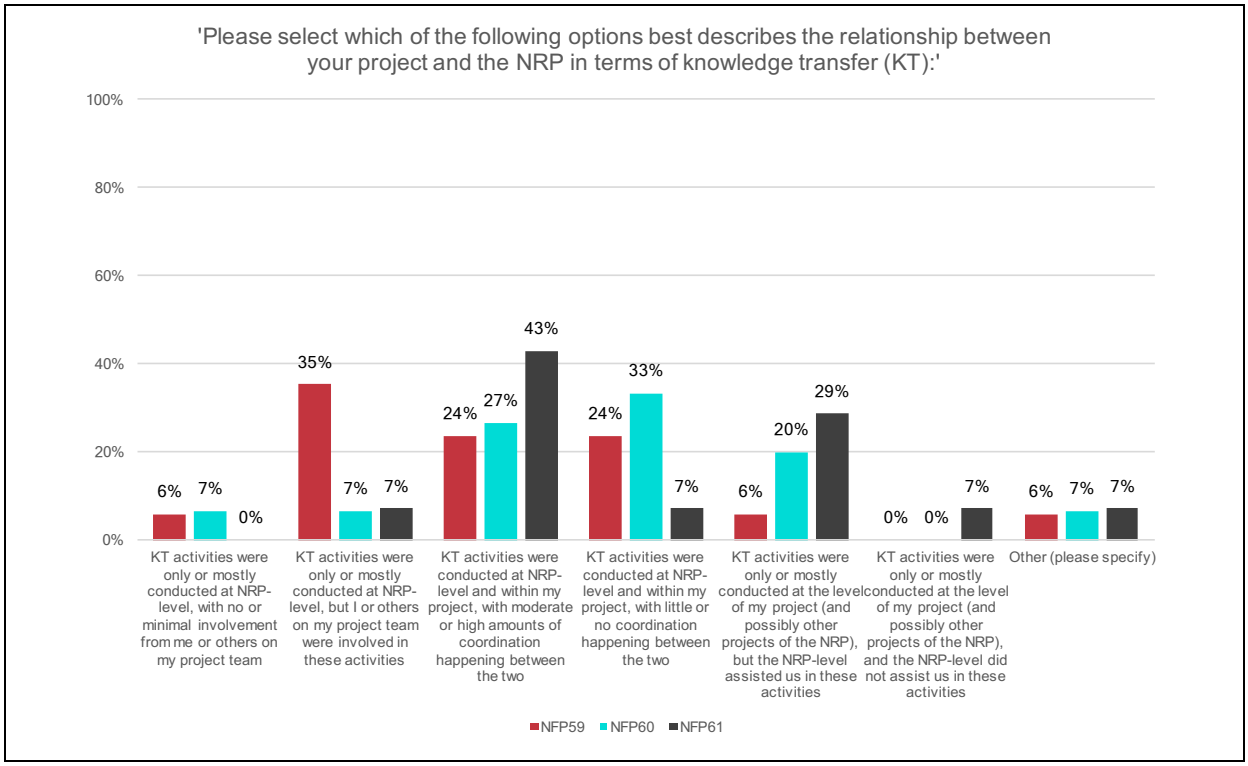
10. To what extent did communications between you and investigators from other projects help to improve the scientific quality of your project?



11. To what extent did communications between you and investigators from other projects help to improve the knowledge transfer of your project to non-academic audiences?



12. Please select which of the following options best describes the relationship between your project and the NRP in terms of knowledge transfer (KT):
KT activities were only or mostly conducted at NRP-level, with no or minimal involvement from me or others on my project team
4%
KT activities were only or mostly conducted at NRP-level, but I or others on my project team were involved in these activities
17%
KT activities were conducted at NRP-level and within my project, with moderate or high amounts of coordination happening between the two
30%
KT activities were conducted at NRP-level and within my project, with little or no coordination happening between the two
22%
KT activities were only or mostly conducted at the level of my project (and possibly other projects of the NRP), but the NRP-level assisted us in these activities
17%
KT activities were only or mostly conducted at the level of my project (and possibly other projects of the NRP), and the NRP-level did not assist us in these activities
2%
Other (please specify)
7%

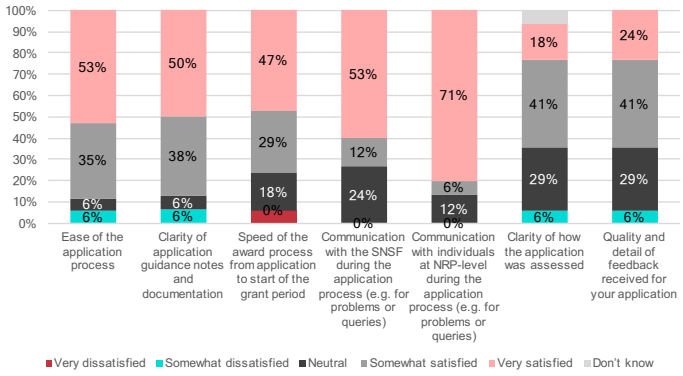


13. Please select which of the following options best describes the nature of your research before you started your NRP project:	14. Before your successful application for research funding under the NRP, had you applied with the same or very similar project to other funding instruments (including SNSF mainstream funding)?	15. Compared with a regular SNSF grant, how would you rate securing an NRP project in terms of benefit to your career?
Basic research into fundamental science questions	Yes, successfully	Much more beneficial
17%	28%	9%
Basic research with the intention of illuminating practical problems	Yes, unsuccessfully	Slightly more beneficial
35%	0%	24%
A mixture of basic research and applied research	No	No difference
43%	72%	37%
Pure applied research		Slightly less beneficial
4%		15%
		Much less beneficial
		0%
		No opinion
		15%

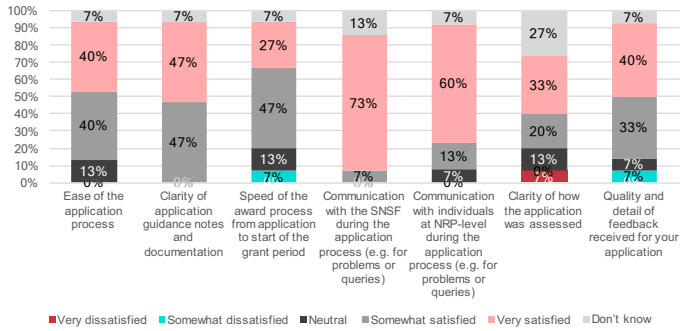
16. Please indicate your level of satisfaction with the following administrative aspects connected to your NRP project application.						
Ease of the application process	Clarity of application guidance notes and documentation	Speed of the award process from application to start of the grant period	Communication with the SNSF during the application process (e.g. for problems or queries)	Communication with individuals at NRP-level during the application process (e.g. for problems or queries)	Clarity of how the application was assessed	Quality and detail of feedback received for your application
Very dissatisfied	Very dissatisfied	Very dissatisfied	Very dissatisfied	Very dissatisfied	Very dissatisfied	Very dissatisfied
0%	0%	2%	0%	0%	7%	0%
Somewhat dissatisfied	Somewhat dissatisfied	Somewhat dissatisfied	Somewhat dissatisfied	Somewhat dissatisfied	Somewhat dissatisfied	Somewhat dissatisfied
2%	7%	2%	0%	2%	9%	13%
Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
7%	2%	15%	13%	11%	17%	17%
Somewhat satisfied	Somewhat satisfied	Somewhat satisfied	Somewhat satisfied	Somewhat satisfied	Somewhat satisfied	Somewhat satisfied
36%	40%	37%	11%	13%	33%	39%
Very satisfied	Very satisfied	Very satisfied	Very satisfied	Very satisfied	Very satisfied	Very satisfied
51%	44%	39%	57%	54%	20%	24%
Don't know	Don't know	Don't know	Don't know	Don't know	Don't know	Don't know
2%	2%	2%	4%	2%	13%	2%
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
2%	4%	2%	15%	17%	2%	4%

6. Please indicate your level of satisfaction with the following administrative aspects connected to your NRP project application.

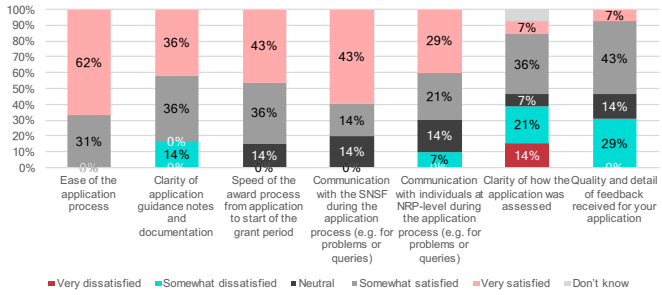
(NFP 59)



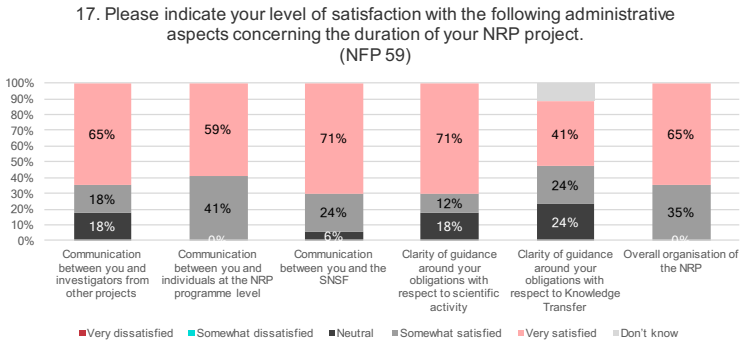
(NFP 60)

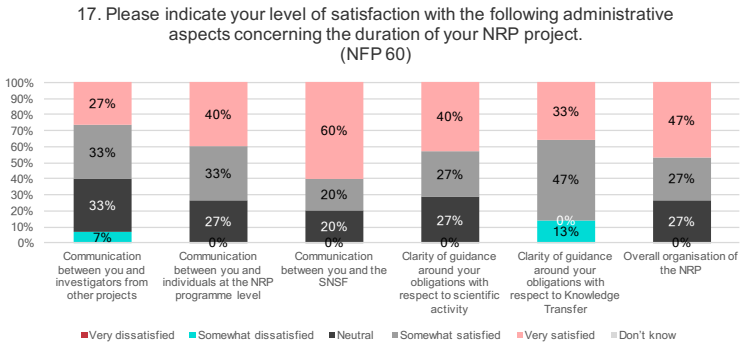


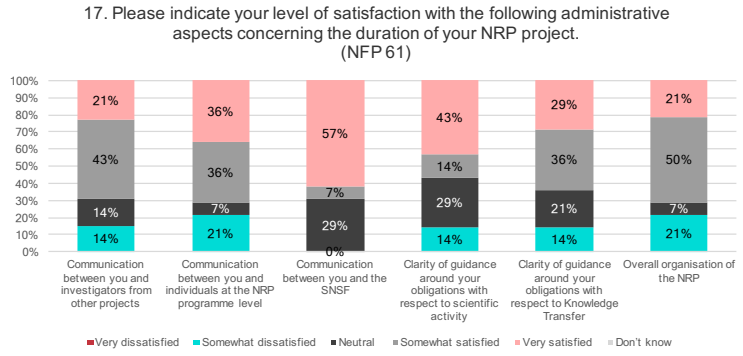
(NFP 61)



17. Please indicate your level of satisfaction with the following administrative aspects concerning the duration of your NRP project.					
Communication between you and investigators from other projects	Communication between you and individuals at the NRP programme level	Communication between you and the SNSF	Clarity of guidance around your obligations with respect to scientific activity	Clarity of guidance around your obligations with respect to Knowledge Transfer	Overall organisation of the NRP
Very dissatisfied	Very dissatisfied	Very dissatisfied	Very dissatisfied	Very dissatisfied	Very dissatisfied
0%	0%	0%	0%	0%	0%
Somewhat dissatisfied	Somewhat dissatisfied	Somewhat dissatisfied	Somewhat dissatisfied	Somewhat dissatisfied	Somewhat dissatisfied
7%	7%	0%	4%	9%	7%
Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
22%	11%	17%	24%	15%	11%
Somewhat satisfied	Somewhat satisfied	Somewhat satisfied	Somewhat satisfied	Somewhat satisfied	Somewhat satisfied
30%	37%	17%	17%	35%	37%
Very satisfied	Very satisfied	Very satisfied	Very satisfied	Very satisfied	Very satisfied
39%	46%	63%	52%	35%	46%
Don't know	Don't know	Don't know	Don't know	Don't know	Don't know
0%	0%	0%	0%	4%	0%
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
2%	0%	2%	2%	2%	0%

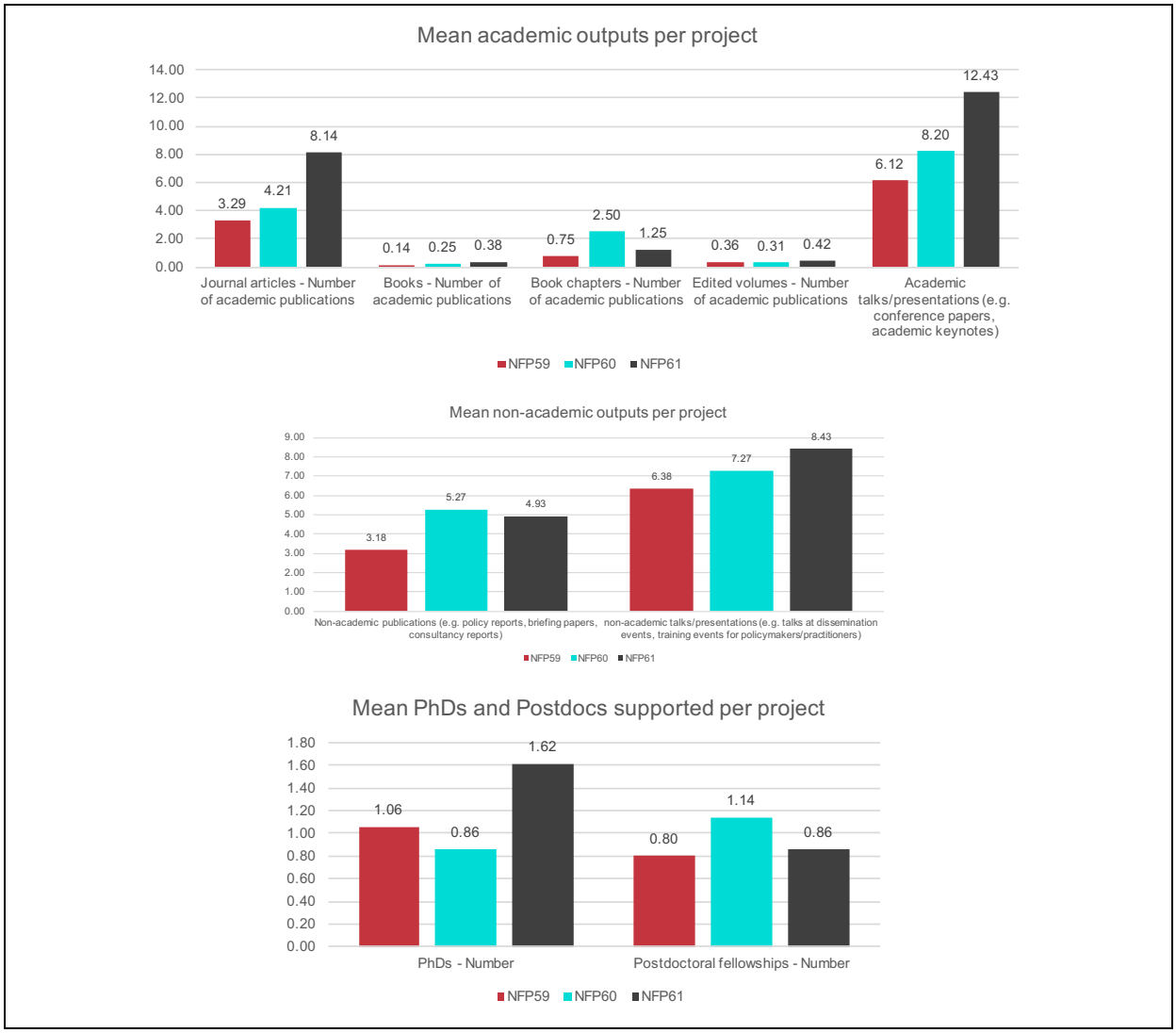






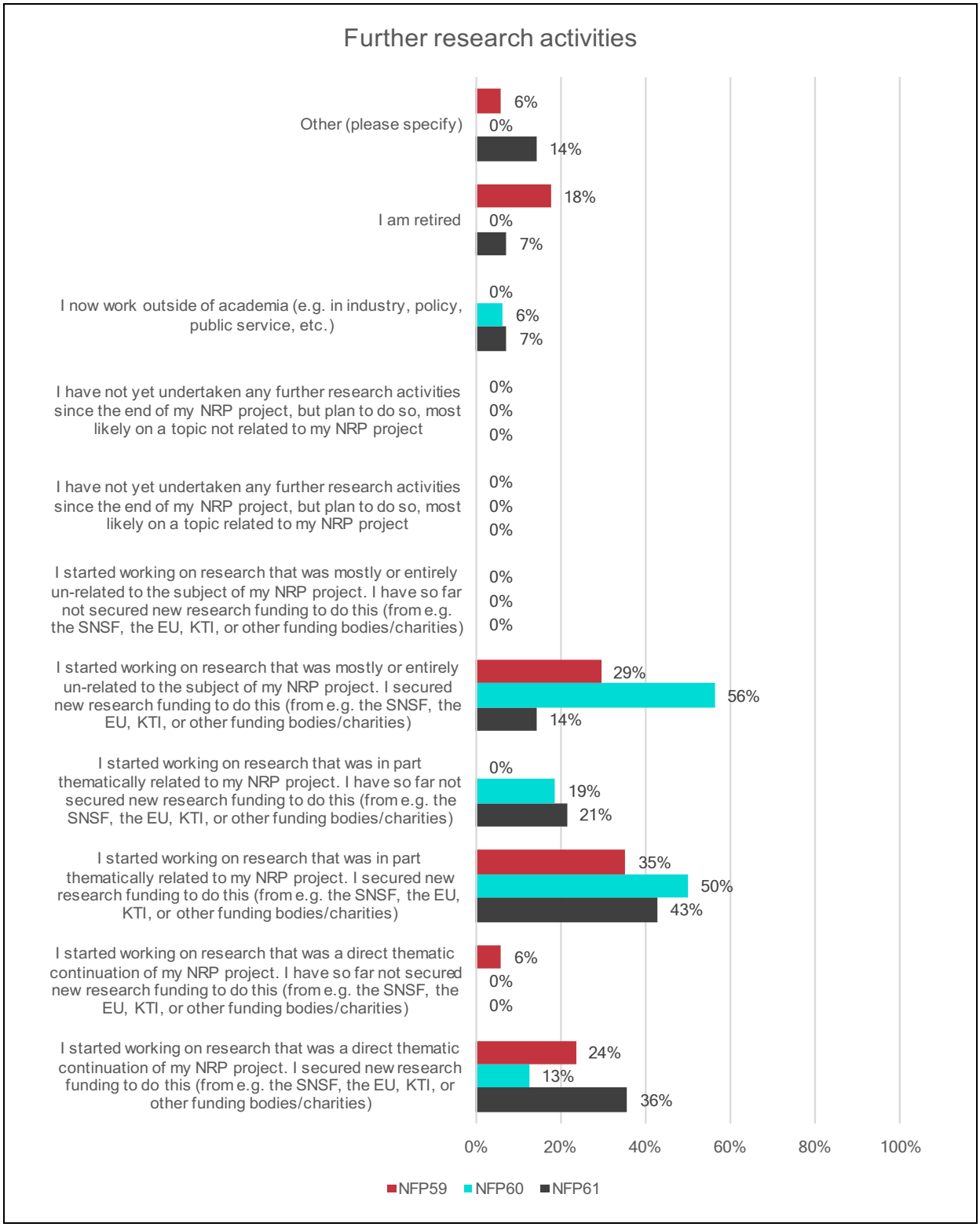
18. Please estimate the total number of academic publications that resulted directly from your project			
Journal articles - Number of academic publications	Books - Number of academic publications	Book chapters - Number of academic publications	Edited volumes - Number of academic publications
Mean	Mean	Mean	Mean
5.09	0.26	1.48	0.36
Median	Median	Median	Median
5.00	0.0	0.5	0.0
At least 1	At least 1	At least 1	At least 1
93%	24%	49%	22%
At least 5	At least 5	At least 5	At least 5
50%	0%	9%	0%

19. Please estimate the total number of academic talks/presentations that resulted directly from your project (e.g. conference papers, academic keynotes)	20. Please estimate the total number of non-academic publications that resulted directly from your project (e.g. policy reports, briefing papers, consultancy reports)	21. Please estimate the total number of non-academic talks/presentations that resulted directly from your project (e.g. talks at dissemination events, training events for policymakers/practitioners)	22. How many PhD students and postdoctoral fellowships were supported through your NRP project?	
-	-	-	PhDs - Number	Postdoctoral fellowships - Number
Mean	Mean	Mean	Mean	Mean
8.72	4.39	7.31	1.16	0.93
Median	Median	Median	Median	Median
8.0	5.0	6.0	1.0	1.0
At least 1	At least 1	At least 1	At least 1	At least 1
100%	96%	91%	67%	57%
At least 5	At least 5	At least 5	At least 5	At least 5
76%	52%	61%	2%	0%



23. Please feel free to note any other academic or non-academic outputs that resulted from your project. (Please skip if not applicable)
[Freetext responses]

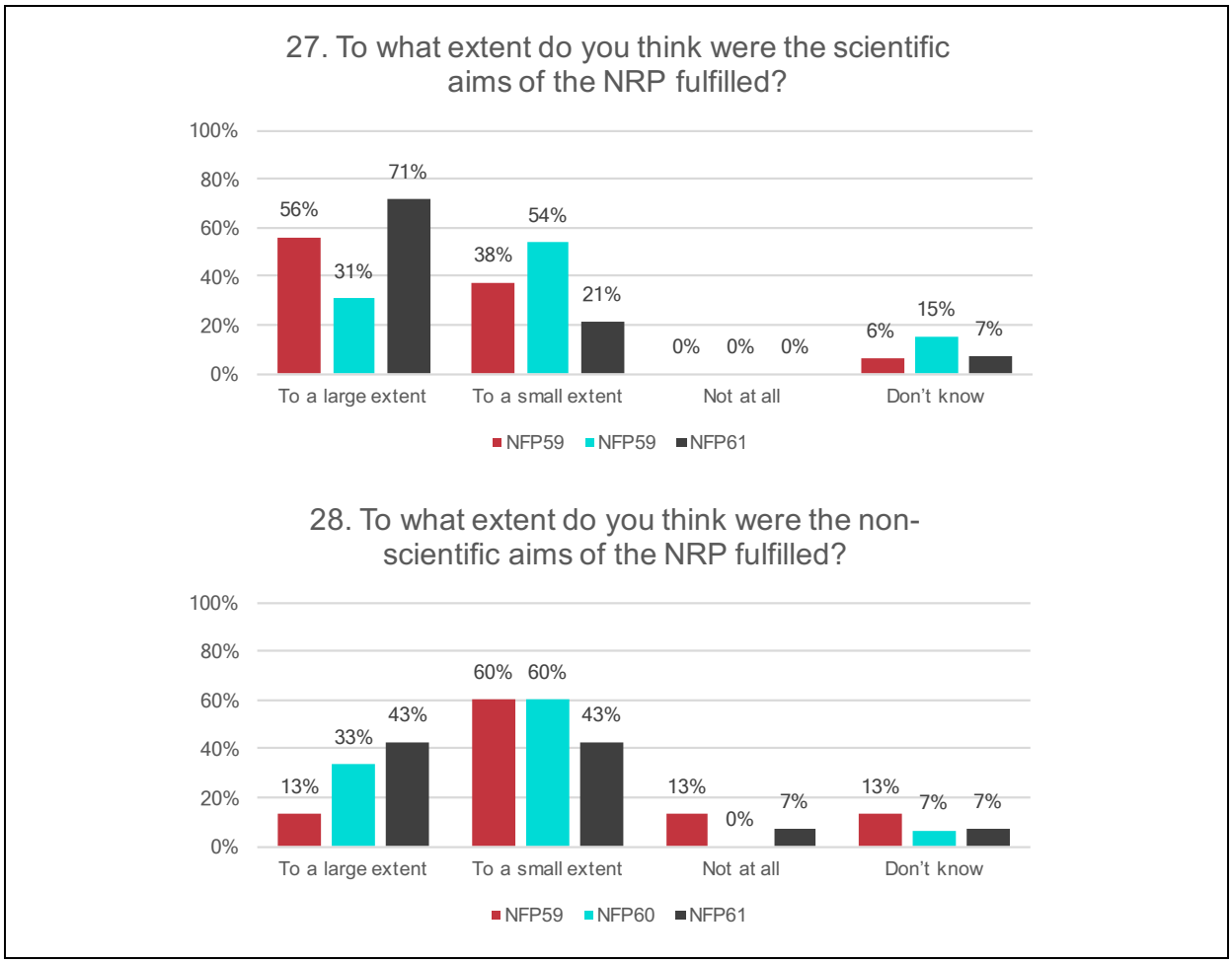
24. Which of the following options best describe how your research activities progressed after the end of your project? (Please tick all that apply)	
I started working on research that was a direct thematic continuation of my NRP project. I secured new research funding to do this (from e.g. the SNSF, the EU, KTI, or other funding bodies/charities)	23%
I started working on research that was a direct thematic continuation of my NRP project. I have so far not secured new research funding to do this (from e.g. the SNSF, the EU, KTI, or other funding bodies/charities)	2%
I started working on research that was in part thematically related to my NRP project. I secured new research funding to do this (from e.g. the SNSF, the EU, KTI, or other funding bodies/charities)	43%
I started working on research that was in part thematically related to my NRP project. I have so far not secured new research funding to do this (from e.g. the SNSF, the EU, KTI, or other funding bodies/charities)	13%
I started working on research that was mostly or entirely un-related to the subject of my NRP project. I secured new research funding to do this (from e.g. the SNSF, the EU, KTI, or other funding bodies/charities)	34%
I started working on research that was mostly or entirely un-related to the subject of my NRP project. I have so far not secured new research funding to do this (from e.g. the SNSF, the EU, KTI, or other funding bodies/charities)	0%
I have not yet undertaken any further research activities since the end of my NRP project, but plan to do so, most likely on a topic related to my NRP project	0%
I have not yet undertaken any further research activities since the end of my NRP project, but plan to do so, most likely on a topic not related to my NRP project	0%
I now work outside of academia (e.g. in industry, policy, public service, etc.)	4%
I am retired	9%
Other (please specify)	6%



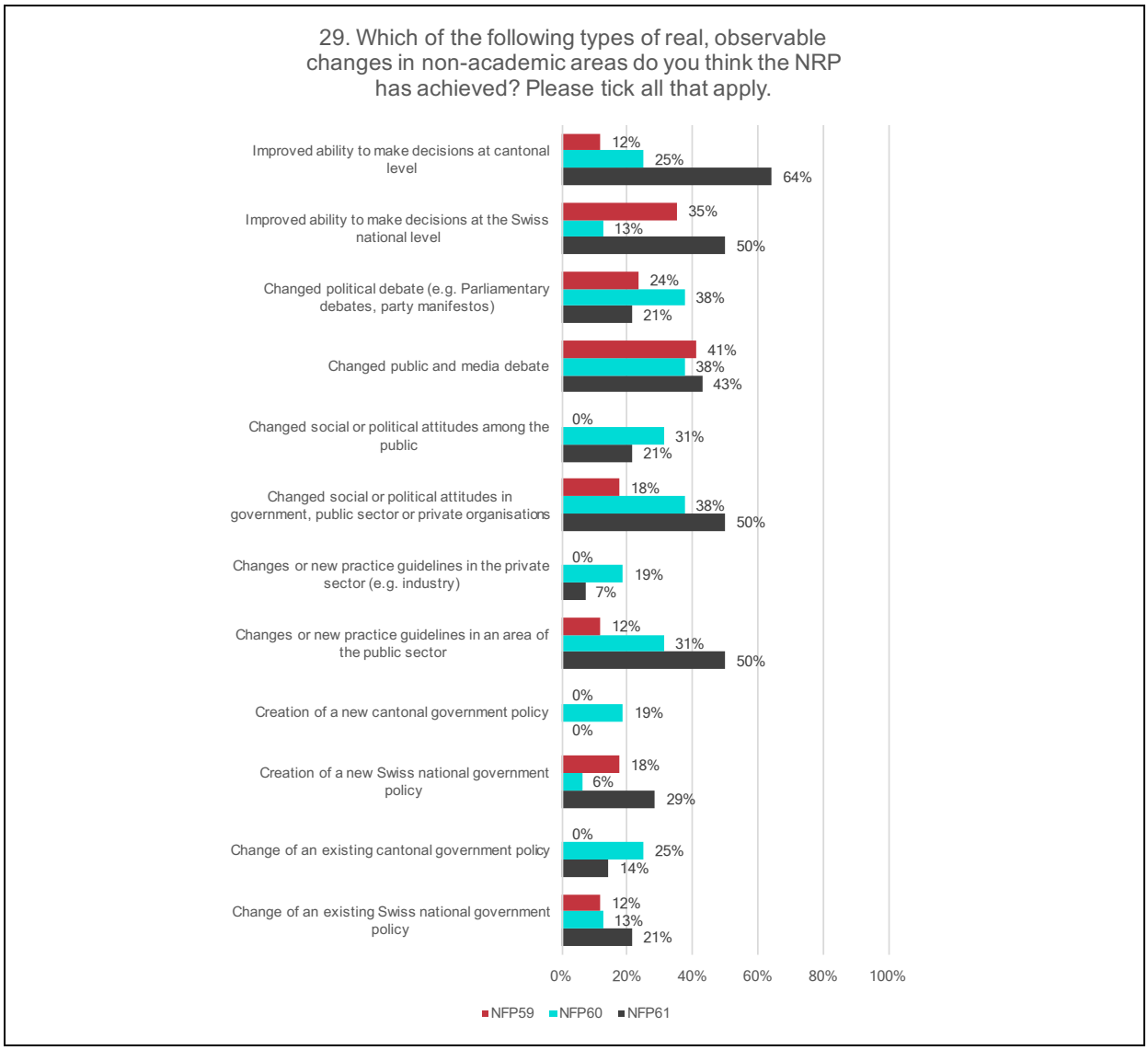
25. Please describe the main non-academic impacts that have resulted from your project:
[Freetext responses]

26. To the best of your knowledge, please describe the main non-academic impacts that have resulted from the NRP as a whole:
[Freetext responses]

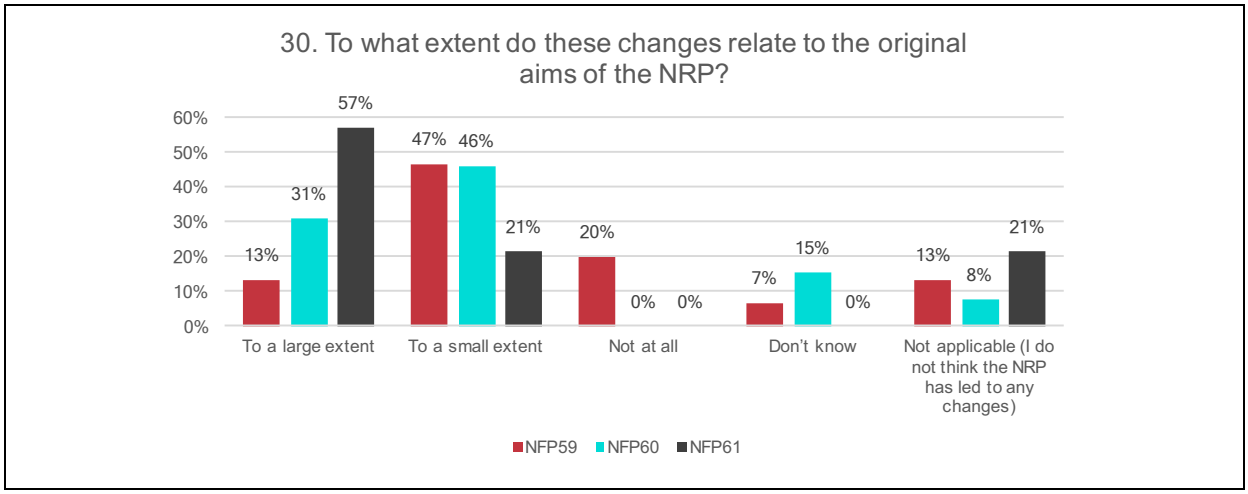
27. To what extent do you think were the scientific aims of the NRP fulfilled?	28. To what extent do you think were the non-scientific aims of the NRP fulfilled?
To a large extent	To a large extent
53%	30%
To a small extent	To a small extent
37%	55%
Not at all	Not at all
0%	7%
Don't know	Don't know
9%	9%



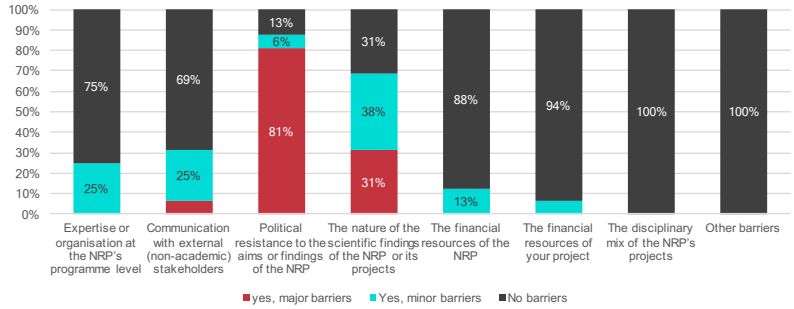
29. Which of the following types of real, observable changes in non-academic areas do you think the NRP has achieved? Please tick all that apply.	
Change of an existing Swiss national government policy	15%
Change of an existing cantonal government policy	13%
Creation of a new Swiss national government policy	17%
Creation of a new cantonal government policy	6%
Changes or new practice guidelines in an area of the public sector	30%
Changes or new practice guidelines in the private sector (e.g. industry)	9%
Changed social or political attitudes in government, public sector or private organisations	34%
Changed social or political attitudes among the public	17%
Changed public and media debate	40%
Changed political debate (e.g. Parliamentary debates, party manifestos)	28%
Improved ability to make decisions at the Swiss national level	32%
Improved ability to make decisions at cantonal level	32%

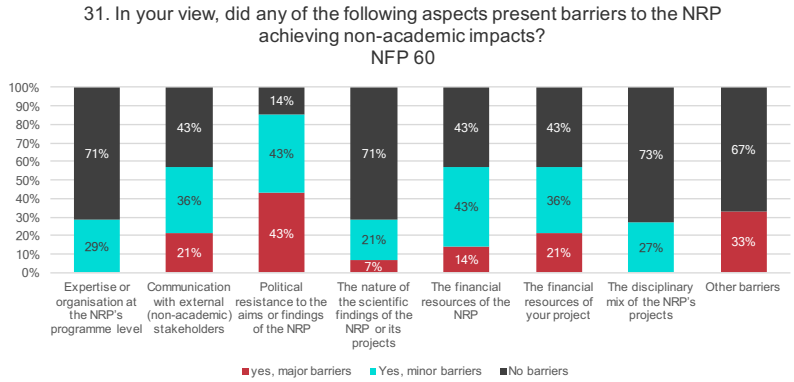


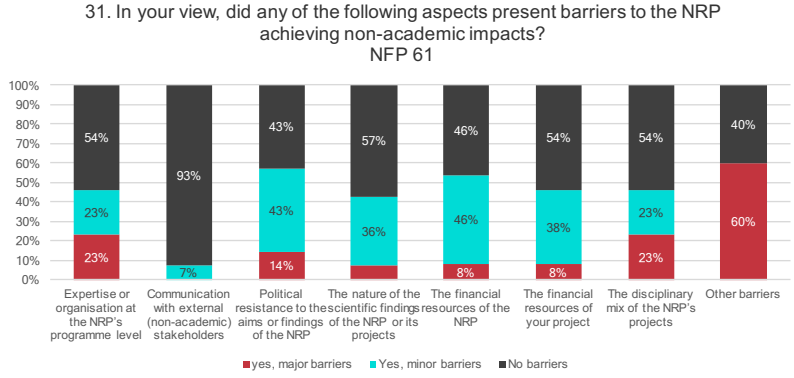
30. To what extent do these changes relate to the original aims of the NRP?
To a large extent
33%
To a small extent
38%
Not at all
7%
Don't know
7%
Not applicable (I do not think the NRP has led to any changes)
14%



31. In your view, did any of the following aspects present barriers to the NRP achieving non-academic impacts?							
Expertise or organisation at the NRP's programme level	Communication with external (non-academic) stakeholders	Political resistance to the aims or findings of the NRP	The nature of the scientific findings of the NRP or its projects	The financial resources of the NRP	The financial resources of your project	The disciplinary mix of the NRP's projects	Other barriers
No barriers	No barriers	No barriers	No barriers	No barriers	No barriers	No barriers	No barriers
67%	68%	23%	52%	60%	65%	77%	69%
Yes, minor barriers	Yes, minor barriers	Yes, minor barriers	Yes, minor barriers	Yes, minor barriers	Yes, minor barriers	Yes, minor barriers	Yes, minor barriers
26%	23%	30%	32%	33%	26%	15%	0%
yes, major barriers	yes, major barriers	yes, major barriers	yes, major barriers	yes, major barriers	yes, major barriers	yes, major barriers	yes, major barriers
7%	9%	48%	16%	7%	9%	8%	31%







32. If you perceive any barriers, please briefly describe these [if you answered 'No barriers' to all above, please skip to the next question]

[Freetext responses]

33. Please feel free to note below any further comments you may have on your project, the NRP, the NRP instrument in general, or any other matters that may help us understand the impacts of NRPs.

[Freetext responses]

34. Please also feel free to enter any comments you may have about this survey, or any thoughts you may have about our task of evaluating the impacts of NRPs.

[Freetext responses]

technopolis |group| United Kingdom
3 Pavilion Buildings
Brighton BN1 1EE
United Kingdom
T +44 1273 204320
E info@technopolis-group.com
www.technopolis-group.com