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Jun 25th, 9:00 AM

A case of design-enabled public policy formulation process

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A case of design-enabled public policy formulation process

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Abstract: Governments are increasingly applying design practices to address public challenges. While the study of these practices evidences their utility for designing public services, the specific design activities and their value for policy formulation are rather unclear. To shed light in this direction, this paper presents a case study on the collaboration of LABgobar and SENASA in reforming the Bovine Tuberculosis regulations in Argentina. By analysing the project's documentation and interviewing project members, this study illustrates design practices that complement traditional policy formulation processes. These practices include methods for problem understanding and reframing, idea generation, and collaborative policy prototyping. Interestingly, these adapt elements coming from multiple disciplines. Despite the potential value of design in policy formulation processes, real adoption remains tied to local -and often small scale- experiments. This paper adds further studies for a more robust understanding of design's contribution to addressing policy challenges.

Keywords: policymaking; policy formulation process; design methods; public policies.

1. Introduction

Over the last two decades, the design practice has been expanding to the public sector to generate solutions for public challenges (Bason, 2014b, p. 3). This coincides with the increasing number of public sector innovation (PSI) units (also receiving other labels as policy labs, PSI labs) and their growing collaboration with governments around the world (Lewis, 2020; Lewis, McGann, & Blomkamp, 2020; McGann, Blomkamp, & Lewis, 2018; Wellstead, Gofen, & Carter, 2021). Many of these PSI units have been applying design approaches and methods, advocating for complementary ways to address public issues (Bason, 2014a; Lewis et al., 2020; Villa Alvarez, Auricchio, & Mortati, 2022).

Recent studies recognise design's contribution to this matter mainly occurs during policy implementation by proposing different ways to deliver better public services (Bason & Schneider, 2014; Hermus, Van Buuren, & Bekkers, 2020; Lewis et al., 2020; McGann et al., 2018). While there are a few cases of PSI units working on policy reforms (McGann et al., 2018), the value of design practices in policy formulation is still unclear (Blomkamp, 2018;



Howlett, 2020; Lewis et al., 2020; Van Buuren, Lewis, Peters, & Voorberg, 2020). Moreover, the characteristics of design activities and methods and the ways in which they are applied in formulating or reforming policies remains relatively unexplored (Hermus et al., 2020; Junginger, 2013; Mintrom & Luetjens, 2016; Vaz-Canosa, 2021; Vaz & Prendeville, 2019). Therefore, further studies on the adoption of design practices in policy formulation and their effects are necessary for understanding the potential applications and contributions of design (Van Buuren et al., 2020).

As part of a larger investigation in this regard, we studied the case of the collaboration of LABgobar (*Laboratorio de Gobierno de Argentina*) with SENASA¹ to reform the regulations for Bovine Tuberculosis (Bovine TB) in Argentina. Through a qualitative case study analysis, we collected data from official documents and project reports, and we interviewed LABgobar's staff and policymakers from SENASA. This paper presents the findings of this analysis specifically highlighting the hybrid methodology used as a combination of design methodology, policymaking methods and methods adapted from other fields (e.g., cause-and-effect analysis, benchmark, randomised controlled trials).

2. Research methodology

This case is part of a PhD research that seeks to understand design practices and methods applied to policy formulation processes and their contribution. The PhD research develops case studies (Yin, 2018) of five PSI units LABgobar, *Equipo de Innovación Pública* (EiP), ThinkPlace, Waag Technology and Society, and PDR, selected from a worldwide sample (Villa Alvarez et al., 2022). The study was conducted starting from the end of 2020 to October 2021. It examined empirical evidence collected from two sources, documentation, and interviews which was analysed through qualitative content analysis (QCA) (Schreier, 2012).

Being one of these cases, the documentation on LABgobar and the Bovine TB project was gathered through internet search and received directly from interviewees. It comprised articles appearing in LABgobar's Medium blog and SENASA's website, as well as regulatory documents, project progress presentations, project reports and other internal records. Additionally, four semi-structured interviews were conducted through videocalls of about one-hour each (James & Busher, 2012) to two members of LABgobar project's unit staff (interviewee 1 and 2) and two policymakers from SENASA (interviewee 3 and 4), allowing to obtain different perspectives on the development of the policy formulation process. The recordings of these videocalls were transcribed obtaining more than 45 pages of qualitative

¹ SENASA is the National Service of Agri-Food Health and Quality (*Servicio Nacional de Sanidad y Calidad Agroalimentaria* in Spanish). It is "is a decentralised body with economic-financial and technical-administrative autonomy and its own legal status" which works under the Ministry of Agriculture, Livestock and Fisheries in Argentinian government (Gobierno de Argentina, n.d.). Among its competences, SENASA is responsible for the national policies on animal and vegetal health and quality, as well as food safety for animal and human consumption. It also executes the policies and monitors their implementation and compliance (Food and Agriculture Organization of the United Nations, n.d.; Gobierno de Argentina, n.d.).

data for analysis. The qualitative data was then coded and categorised through QCA looking at it in inductively and deductively ways guided by the PhD research questions². This analysis aided to identify: the activities conducted in the process of reforming the Bovine TB regulations, the design practices and methods applied, the results of the process and the specific contributions of design to the policy reform. This paper summarises and describes the process presenting insights from the data analysis.

3. Bovine tuberculosis project context

In 2016 the Argentinian National Government created the Ministry of Modernization as part of a strategic plan to improve the capacities of the State. The plan aimed at promoting new forms of State management, with three priorities: applying modern technologies to public administration, bringing citizens close to the Government, and implementing projects assisting local and regional administrations (Ministerio de Justicia y Derechos Humanos Presidencia de la Nación, 2016). The development of this plan included the creation of LABgobar, an internal multidisciplinary lab involving professionals from business economics, anthropology, political sciences, and service design. The team had the role to support various levels of government in developing people-centred projects regarding public policy strategies or solutions and generating new capabilities (Academia de Diseño de Políticas Públicas, 2019).

With the aim to modernize regulations and the process to formulate them, in 2019 LABgobar, together with SENASA, gave life to an executive programme focused on “the agile design of regulatory policies”, meaning a programme aimed to develop iterative processes to rapidly develop policy solutions (Dominguez Vidal, 2020). This program consisted in 4 half-day meetings in which teams from various areas of SENASA worked on concrete challenges, using design methodologies, and integrating concepts from the expertise of the LABgobar staff (e.g., anthropology, business and management, design, and political sciences) and other fields like behavioural sciences. During the meetings, about 70 staff members of SENASA worked in various policy challenges applying design-led methodologies (Dominguez Vidal, 2020).

Building on this initial experience and with the consent of the President of SENASA, LABgobar provided a more in-depth support to two teams from this programme. According to interviewee 2, these two teams were examining highly relevant and recurrent problems for the organisation. One was the prevention of Huanglongbing² disease affecting the citrus production, and the other, the control and eradication of Bovine TB (Dominguez Vidal, 2020; Dominguez Vidal & LABgobar, 2019). As interviewees acknowledged, while both problems

² Huanglongbing (HLB) is a citrus disease mainly caused by the bacterium *Candidatus Liberibacter asiaticus*. This disease affects all citrus plants and some ornamental plants and spreads through its insect vector *Diaphorina citri* or utilizing infected material such as buds or plant parts. This disease has no cure and evidences the plant is infected by showing symptoms in leaves and fruits.

had already implemented policies³, they knew the current solutions were not effective. Additional to the relevance of these problems, LABgobar identified in these teams, potential partners to develop further collaborations. For instance, interviewee 2 noted that during the executive programme these two teams showed a greater openness to exploring novel solutions to these problems and addressing them in an unusual way.

This paper focuses only on the project for reforming Bovine TB regulation introducing the characteristics of this disease, the situation with the current regulation, the project approach and the policy formulation process developed by LABgobar and SENASA.

3.1 Bovine Tuberculosis problem and its regulations in Argentina

TB is a chronic disease that affects cattle establishments producing meat and milk that can also be transmitted to humans (SENASA, 2012a). The current *National Plan for Control and Eradication of Bovine Tuberculosis* in Argentina came into effect in 1999 and was updated in the resolution 128-2012 (SENASA, 2012a). The resolution of 2012 defines regional programmes for control, eradication, or free zones according to the levels of prevalence of the TB disease in the cattle establishments. To classify the regions in these three categories, a veterinarian tests the herd for the disease and dictates the establishments are TB-free or need to isolate and slaughter the cattle resulting TB-positive (SENASA, 2012b).

According to interviewee 3, these regulations classify the cattle establishments in two statuses: TB-free or in sanitation, and while around 70% of the establishments were certified TB-free (Dominguez Vidal, 2020), SENASA was aware they were not actually free. For interviewees 3 and 4, the problem is even more complex as TB is a chronic disease difficult to eradicate, vaccines afford no adequate protection to cattle, and its diagnosis may not always be effective. Moreover, many cattle establishments do not proceed with the sanitation plans as TB-free certificates are not required by some industries in the productive chain or lack traceability.

3.2 Bovine TB project approach and methodology

A few National Government agencies around the world have formalised policy cycles as guidelines or pedagogical representations of public policy processes (Althaus, Bridgman, & Davis, 2017; HM Treasury, 2003; Torres-Melo & Santander, 2013). While not systematically ordered as in theory, interviewee 4 recognises in SENASA's processes the following activities:

- problem diagnosis;
- policy goals' definition;
- policy document drafting;

³ The National Program for the Prevention of Huanglongbing (PNPHLB) was created by resolution in 2009 and ratified by National Law in 2013 (Congreso de la Nación Argentina, 2013; SENASA, n.d., 2009). The National Plan for Control and Eradication of Bovine Tuberculosis was approved by the resolution 115 in 1999 and updated by the resolution 128 in 2012 (SENASA, 1999, 2012a, 2012b).

- National Director draft review;
- public consultation on the draft;
- incorporation of inputs from consultation; and
- final approval for implementation by SENASA’s President.

Interviewees did not acknowledge any structured methodology for policy formulation in SENASA. Therefore, for the Bovine TB project, LABgobar proposed a policy formulation process extracted from the general SENASA’s policy formulation activities. This was further complemented by their methodological approach (Figure 1) based on the Design Council’s (2007, 2019a) Double Diamond (Figure 2). The resulting process combines activities applied by SENASA’s policymakers with methods adapted from design and the other fields mentioned above (e.g., anthropology, business, management).

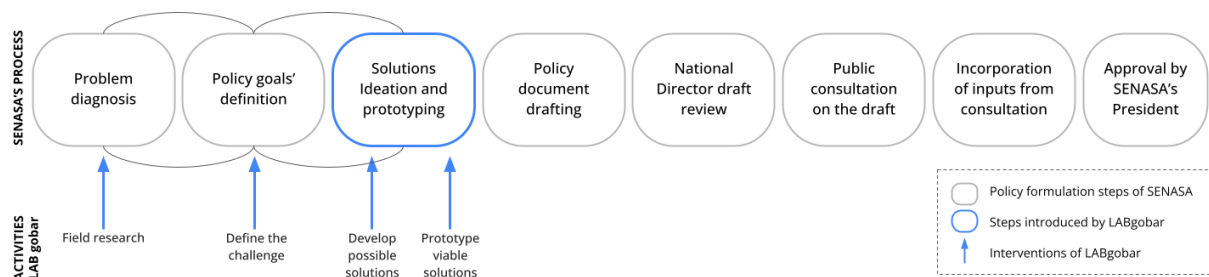


Figure 1. Overview of LABgobar’s proposed policy formulation process. Adapted from Villa Alvarez (2022).

More specifically, LABgobar adopts the Double Diamond to support different agencies in various moments of the policy process. For this purpose, the original phases (*Discover, Define, Develop* and *Deliver*)(Design Council, 2007, 2015, 2019b) are reframed into “problem area” and “solution area” (Academia de Diseño de Políticas Públicas, 2019; Dominguez Vidal & LABgobar, 2019; LABgobar, 2020):

- The problem area focuses on contextual immersion to generate understanding about the issue and reframe the policy challenge. In this area, the activities seek to 1) discover and research and 2) define the challenge (Discover and Define phases from the Double Diamond).
- The solution area is about creating alternative solutions to address the policy challenge, and later prioritize those solutions for testing and implementation. In this area, the activities seek to 3) generate and select ideas for possible solutions and 4) prototype viable options of solution (Develop and Deliver phases from the Double Diamond).

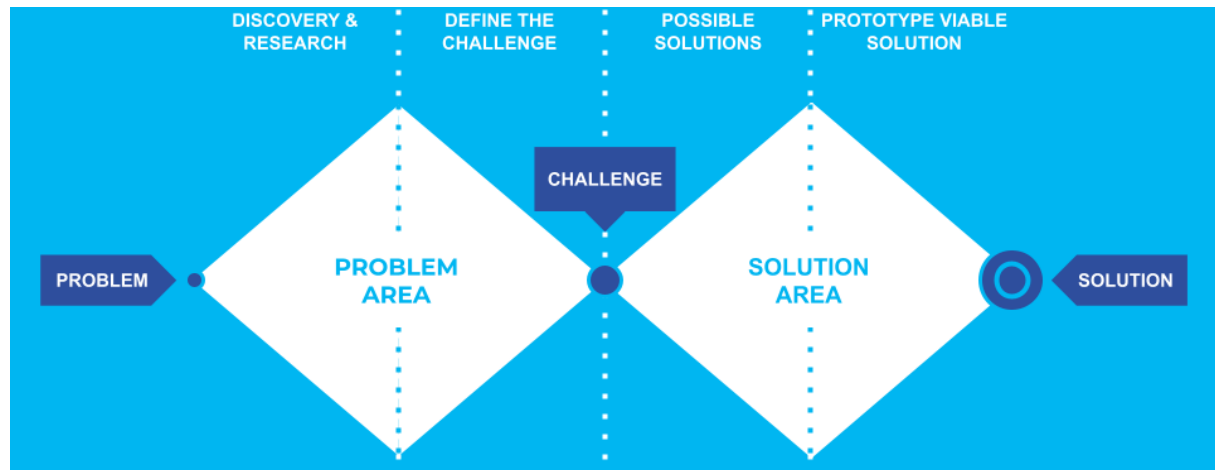


Figure 2. The Double Diamond as applied by LABgobar. Source: Dominguez Vidal and LABgobar (2019).

4. Hybridization of a public policy formulation process

The Bovine TB policy reform process started as a need to update the Resolution 128 of 2012 which approved the most recent National Plan for Control and Eradication of Bovine Tuberculosis in Argentina (TB National Plan) (SENASA, 2012a, 2012b). The control of Bovine TB represents a complex problem as it is a chronic disease implying multiple variables for its diagnosis, certification, and animal replacement. According to interviewee 1, the initial problem framing was to address the 30% of the farms without the disease-free certification identified as one of the most relevant issues affecting the TB control and eradication. Thus, the policy intent of SENASA's team was to increase the number of productive units in Argentina with certificates free of TB (LABgobar, 2019c).

Interviewees 1 and 4 recalled that one of the initial ideas to address the policy intent was to motivate producers to certify their cattle by financing the replacement of TB-positive animals. By developing this idea, the producer would slaughter the affected animal and the State would subsidize the producer to acquire a healthy animal substituting the lost one.

However, the collaboration with LABgobar projects' unit challenged the initial problem framing and solution by guiding the team of SENASA through a design process in which they followed four phases:

- Discover and research: understand the Bovine TB problem.
- Define the challenge: reframe the Bovine TB regulation goals and identify opportunities for intervention.
- Develop possible solutions: ideate and prioritize solutions to control Bovine TB in Argentina,
- Prototype viable solutions: test solutions and prototype new Bovine TB regulations.

For 6 months, LABgobar projects' unit and SENASA's team (*the project team* from now on) developed a design process, combining policy formulation methods traditional to SENASA

with new methods coming from design and the other expertise involved in the team. The following sections list the methods applied in each phase. We particularly describe those methods which combine competences from design and other fields (hybrid methods).

4.1 Discover and research: Understand the Bovine TB problem.

In this phase the project team developed a series of activities to collect and examine information about the Bovine TB problem and its regulations' compliance. Exemplar activities run here include quantitative diagnosis, decision process mapping, field research, research analysis and synthesis, and review of other countries' regulations (LABgobar, 2019a). The activities and methods in this phase are listed in table 1, while the empirical design methods are described in the following paragraphs.

Table 1. Overview of methods applied in the Discover and research phase. Elaborated by the authors.

Activity	Method	Comments
Quantitative diagnosis	Quantification of the problem	-
	Selection of location and research participants from quantitative data analysis	Hybrid method
Process mapping	Decision flowchart used as a user journey map	Hybrid method
Field research	Group meetings (or group interview)	-
	Interviews in specific locations (or contextual inquiry)	Design method
	Site visits and observation	-
	In depth interviews	-
Research analysis and synthesis	Qualitative data analysis	-
	Archetypes/ Personas	Design method
	Decision flowchart and table of decisions	Hybrid method
	Opportunities' analysis	-
	Analogical reasoning	-
	Cause-and-effect analysis -Ishikawa diagram-	-
Review other countries' regulations	Benchmark	-

1. Quantitative diagnosis:

According to interviewee 4, SENASA counts on a robust sanitary information system. This system collects quantitative data about agricultural establishments, sanitary activities of

private veterinarians, animal slaughtering and notifications of diseases. The analysis of national statistical data allowed the project team to identify the distribution of dairy farms, the number of productive establishments and bovines out of the TB National Plan in the different provinces and localities, the local offices responsible for sanitation controls and the frequency of these controls.

By visualising and analysing this data, the project team quantified multiple dimensions of the problem and selected the province of Cordoba to conduct field research. This province registered the highest number of bovines out of the TB National Plan with about 300K bovines, 75% of which concentrated in 3 contiguous localities. Moreover, 100K bovines out of the TB National Plan were in farms of 250-1000 head of livestock and depended on 4 local sanitation offices (LABgobar, 2019a). This analysis also aided the project team to select research participants for field research such as big (+500 head of livestock) and medium (250 heads of livestock) producers, and local sanitation officers. According to interviewee 1, once identified the localities in Cordoba, LABgobar suggested different profiles of actors to conduct qualitative research, and SENASA recruited the participants.

2. Decision process mapping:

The project team elaborated a *decision flowchart* which according to interviewees 1 and 2 was treated as a user journey map. The flowchart was used to visualise the ideal process of sanitation until the TB-free certificate was issued. This helped LABgobar to understand the process and served to generate an internal discussion with SENASA's team about the key issues of the process. Through these activities, the project team defined research hypothesis, and prepared to conduct field research.

3. Field research:

LABgobar members went to the selected localities in Cordoba with the technical team of SENASA, the leader of the tuberculosis program and SENASA's local territory workers in charge of the area (Extended SENASA team). Together they had group meetings with veterinarians and producers, visited productive establishments and a refrigeration warehouse, and interviewed veterinarians, producers, and industry referents collecting data from more than 40 subjects (LABgobar, 2019a). For this field research, LABgobar applied qualitative research methods inspired by *group interviews*, *contextual inquiries*, *observation*, and *interviews*. According to interviewee 1, rather than gathering evidence from a representative research sample, this research aimed to talk with a variety of actors and get an idea of the policy implementation strong and weak points.

4. Research analysis and synthesis:

The data obtained from the mixed research methods was analysed by the project team through multiple methods: qualitative data analysis to identify key insights, archetypes - personas- characterising the various actors found in the field, decision flowchart iteration, opportunities analysis, analogical reasoning, and cause-and-effect analysis through Ishikawa diagram (LABgobar, 2019a).

Among these methods, the **decision flowchart** (Figure 3) was used to present the TB-free certification process in theory and in practice. This method allowed to analyse the processes of TB-free certification and was iterated with the insights from field research. Moreover, it displayed the hypothesis, the behavioural biases observed in the field, and the opportunities for intervention for each step of the process. The flowchart was later transformed into a **decision table** (Figure 4) for further analysis also adding the rationale for the actions observed when the farmer seeks to obtain TB-free certification (LABgobar, 2019a)

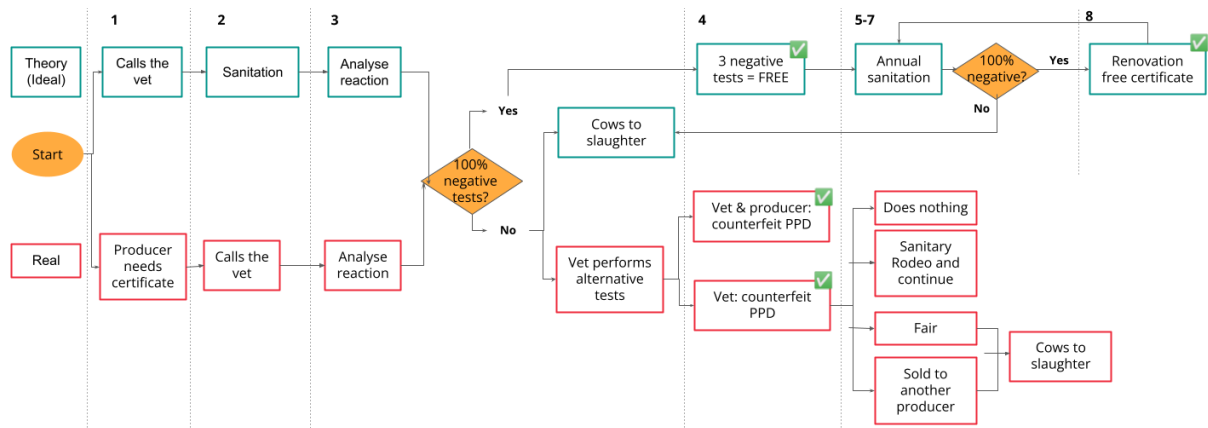


Figure 3. TB-certification process' decision flowchart. Process in theory (green), in practice (red). Adapted and edited from Villa Alvarez (2022), translated from LABgobar (2019a).

	1	2	3	4	5	6	7	8
Theory (Ideal)	The producer calls a veterinarian (vet) for a sanitation.	The vet performs tests.	The vet reviews tests results. TB cows are sent to slaughter.	The vet tests every 90 days. If all 3 tests are negative, it is BT free.	The vet returns for annual sanitation	N/A	N/A	TB-free certification
Real	The producer needs the TB-free certificate to carry out a procedure.	The producer calls a vet friend to do the sanitation.	The vet reviews tests results and performs alternative tests to check false positives.	In case of TB Positive results: -the vet friend makes the certificate. -the producer uses a RENSIPA that already has the certificate. - the producer finds a vet who is a "good news seller".	TB-free certificate serves to: - move the TB cows to sanitary herd for dairy farming. - sell the TB cows at a fair. - sell TB cows to another farmer.	Options: -cows that have completed their lactation cycle are sent to slaughter. -cows go from fair to slaughter.	The slaughterhouse seize TB cows. Seizure's costs splits between the slaughterhouse and the fair. The numbers of carcasses and the caravan at the slaughterhouse don't match.	The producer conducts the sanitation but with 1 or 2 TB positive cows he loses the free status.
Hypothesis	Sanitation is not a priority for the producer.	The producer believes and follows the advice of the vet.	Information asymmetry initiates rural myths.	Not compliance of regulations seems not to have consequences.	Replacement of positives is costly.	Transactions at fairs are scarcely controlled.	Buying uncertified cows is economically positive.	TB-free certification requires a lot of effort and it can be easily lost.
Biases identified	- Solve immediate problems - Prioritise other urgent tasks	The word of the vet is important	-The veterinarian seek for evidence to confirms his intentions. -The sanitation method appears less serious.	"I won't get caught". "Other producers in the area do the same". "The vet friend will help".	"The rest of the producers in the area do the same". "Nothing is going to happen" "I'd rather take the risk and keep earning money now".	N/A	N/A	Reward of compliance is low VS the cost of compliance.
Rational	No need for TB-free certificate.	N/A	N/A	N/A	It is costly to send cows for slaughter.	N/A	Confiscation is less costly	N/A
Intervention opportunity	- Reminders - Checklists	- Packaging of tuberculina - Anchoring, as a veterinarian.	- Reduce information asymmetry	- Wake-up call	- Sanitary herd as a contingency measure	- Make TB-positive cows visible	- Validate convenience of not complying. - Match the number of carcasses and caravan.	- Eliminate the dichotomy of free/not free

Figure 4. TB-free certification process' decision table. Adapted and edited from Villa Alvarez (2022), translated from LABgobar (2019a).

5. Review other countries' regulations:

The project team examined Bovine TB regulations from various countries through benchmark comparing the interventions on multiple aspects identified as key issues during field research.

4.2 Define the challenge: Reframe the Bovine TB regulation goals and identify opportunities for intervention.

According to interviewee 1, after the presentation of the research findings, SENASA's decision-makers acknowledged the need to make structural changes to the regulation. Among these changes, one of the conclusions as stated by interviewee 4, was that the TB National Plan should be addressing primarily the control of the disease:

“During the first meetings, we talked about an eradication program and in the last meetings we talked about a control program. Eradication interventions are very different from those for control. In eradication, we start from a baseline where the disease prevalence is so low that we are close to eliminating the last sick animals. We ended up realizing from analysed data that, in reality, the prevalence was not at the level of an eradication program, but of a control program. So, we had to think about intervention measures for TB control.”

Moreover, interviewee 2 observed that research aided to “circumscribe a wicked problem into smaller ones” and interviewee 3 recognised that field research allowed SENASA's team to consider other aspects of the productive chain which were not considered before (e.g., lack of SENASA's control in the milk processing). Some of the challenges found through research were (Dominguez Vidal & LABgobar, 2019; LABgobar, 2019a, 2019c):

- Under-dimensioned Bovine TB real prevalence, more than the estimated productive established were not TB-free.
- Low reliability of the TB-free certificate (e.g., cattle certified and not tested, TB-free farms with infected animals).
- Dichotomic regulation “TB-free or not free” did not consider the percentage of ill animals for sanitation interventions.
- Farmers and producers had little incentives or need to obtain the TB-free certificate.
- Low traceability of the cattle from the farm to the productive establishments.
- Lack of official communication directed to veterinarians.

For these challenges, the Bovine TB project team recognised mid and short-term opportunities of interventions on the decision flowchart and table, opportunities' analysis, and the cause-and-effect analysis.

4.3 Define possible solutions: Ideate and prioritize solutions to control Bovine TB in Argentina

The challenges and opportunities were transformed into questions applying the **How might we? design method in a viability-impact prioritization matrix** (Figure 5) (LABgobar, 2019b). These questions served for **brainstorming ideas of interventions**. Interviewee 1 described

the process of prioritizing and selecting the questions and ideas by asking SENASA’s team and decision-maker to individually vote on them by adding dots.

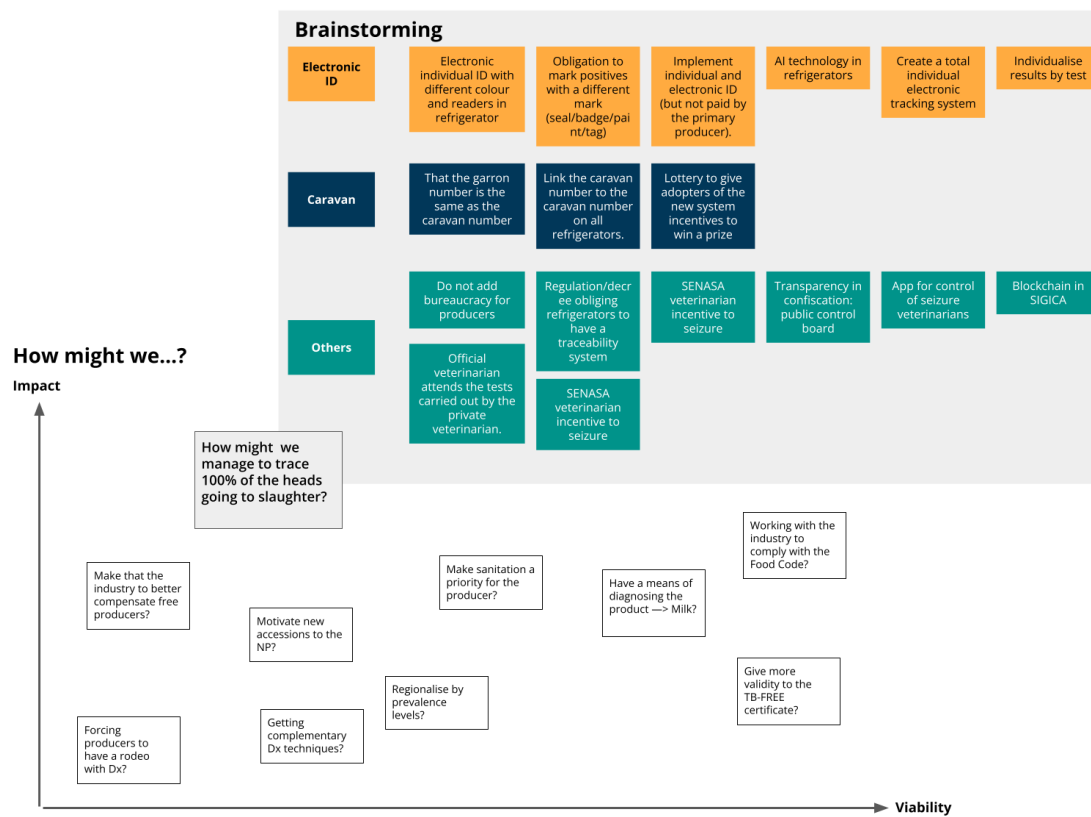


Figure 5. “How might we?” questions in a viability-impact prioritization matrix and brainstorming from one question. Adapted and translated from LABgobar (2019a).

4.4 Prototype viable solutions: Test solutions and prototype new Bovine TB regulations.

The Bovine TB project team selected two interventions’ ideas to test. One was a communication *experiment* with veterinarians, and the other, the collaborative prototyping of a new Bovine TB regulatory framework.

The communication **experiment**, as described by interviewee 1, combined prototyping with randomised controlled trials (RCTs). The RCTs consisted in sending e-mail messages to two groups of veterinarians while no message was sent to two control groups. These e-mail messages were initially prototyped and tested internally with LABgobar, SENASA’s team and the agency’s communication team, addressing distinct types of messages and defining “punitive” and “awareness” tones of voice. Both messages included two buttons which redirected veterinarians to SENASA’s website (Figure 6). The effects of the messages were measured against the control group. These experiments served to gather additional data about the reliability of the TB-free certificates and decide on further interventions.

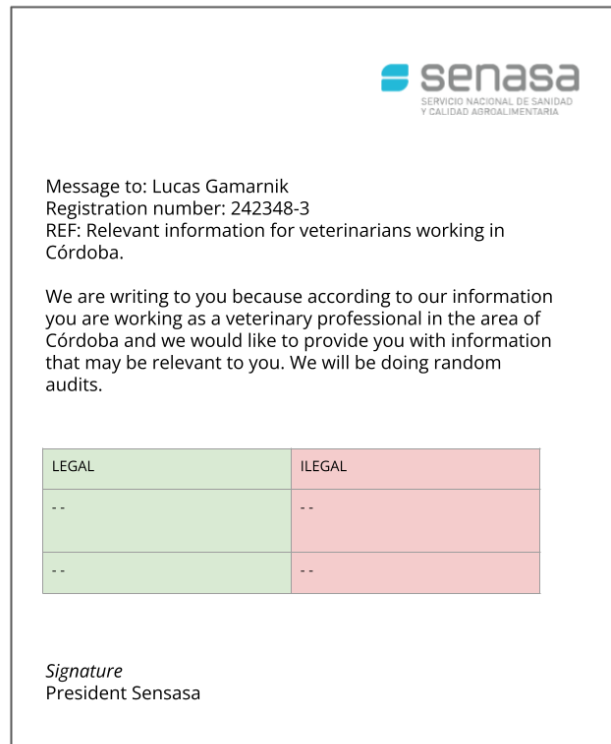


Figure 6. Prototype of a message for veterinarians. Adapted and translated from LABgobar (2019b) (2019c).

The **collaborative prototyping of the new Bovine TB regulatory framework** was developed in a one-day co-creation session in which LABgobar and SENASA’s policymakers revised together the 2012 Bovine TB regulations and defined the criteria for its reform according to research findings and analysis. Participants used spreadsheets (Figure 7) to create a new Bovine TB regulatory framework collecting and analysing several aspects such as the current regulation description, potential changes, considerations for those changes, key actors, threats, and opportunities. Interviewee 3 describes this work as follows:

“We generated a very interesting green paper on what a new regulatory framework should look like, contemplating different actors in the productive chain as producers who are in sanitation, with a medium prevalence, producers who are in sanitation with a high prevalence, and producers who are really free.”

Using the inputs from the Bovine TB regulatory framework, one SENASA’s policymaker wrote the draft for the new policy. According to the interviewees, this was the last activity regarding this policy reform process as the entire Bovine TB project team changed with the inauguration of the upcoming Argentinian president at the end of 2019. As of today, no further work has been developed towards the approval or implementation of this new policy.

Axis	Theme	Current regulations	Current situation	Definition	Requirements for its implementation	Key actors	Threats	Opportunities
CONTROLS AND INCENTIVES	Corresponding vets	Not contemplated.	- No information on which professionals work in which facilities - High turnover of professionals in the facilities	Enrollment of veterinarians associated as Health Correspondents to each PU	- Manual start through SUR - Transition to integration in TB module	College of Veterinarians SENASA local offices	Extra administrative work for the producer	- Increased traceability of professional activity and reduced turnover. - Revision/Dissemination of technical and normative contents for reaccreditation.
	Controls and sanctions	Contained in the SENASA Framework Law: a) Public or private warning b) Fines of up to AR\$ 10,000,000 c) Suspension for up to 1 year or cancellation of registration d) Temporary or definitive closure of the establishments. e) Confiscation of products, by-products and/or related elements.	Not applicable	Competence of the TB Program: - Warning; Record of findings - Temporary suspension of immediate application Competence of the Coordination of Infractions: - Definitive suspension: subject to SENASA Law conditions. - Economic fine: - Veterinarians - Producers who fail to comply with the Sanitation Plan. - Producers who do not enter the Plan after the 2nd notification.	Budget to guarantee SENASA's presence in the field. An agile and effective sanction system that is not delayed over time.	College of Veterinarians SENASA local offices	Abusos/desvíos posibles por parte de veterinarios SENASA	

Figure 7. Section of the prototype of the Bovine TB regulatory framework. Adapted and translated from (SENASA & LABgobar, n.d.)

5. Findings: Design contributions and limitations

This case illustrates a hybrid policy formulation process which combines traditional policymaking activities with design activities. Interestingly, while various of the methods applied seek to understand the users' policy experience, these are rarely exclusively referring to design. Instead, these methods evince a disciplinary cross-fertilization, illustrating ways in which design practices can complement traditional policy formulation processes as suggested by other scholars (Lewis, 2020; Lewis et al., 2020).

Design literature suggests potential contributions of design to policymaking (Bason, 2014a) while its value for policy formulation requires further clarification (Blomkamp, 2018; Howlett, 2020; Lewis et al., 2020; Van Buuren et al., 2020). In this study policymakers recognised a series of contributions of the LABgobar's approach to the traditional SENASA's policy formulation. Moreover, interviewees recognise design approaches face limitations to participate in policy formulation processes. Both contributions and limitations are described in the following paragraphs.

5.1 Design contributions to policy formulation

The first contribution is referred to providing a more systematic structure to the activities in a policy formulation process. Theoretically, the policy formulation process can be developed in systematic phases (Howlett, Ramesh, & Perl, 2009; Thomas, 2001). However, interviewees 3 and 4 reported that SENASA has no definite methodology for policy formulation.

Therefore, approaching policies through systematic activities was a new experience for them. Moreover, interviewee 3 considers that having more systematic phases for the policy formulation process is fundamental. In fact, for "certain multidimensional policies" a process as the one followed with LABgobar "should be kind of standardized and almost a norm" (Interviewee 3, personal communication, September 22, 2021).

The value of the process proposed by LABgobar was also detected by the interest in replicating it and sharing the Bovine TB case with missional areas of SENASA (e.g., vegetal protection, animal health). For instance, interviewee 3 explained how SENASA's team

attempted to use this process for formulating other policy problems such as the Bovine Tick. Also, after the Bovine TB project, LABgobar was invited to present the case to the Mycobacteria Infection Commission.

Additionally, according to interviewee 4, the application of the design methodology “shortens a lot the time on defining the problem and its causes”, reducing the time to formulate a policy draft. In the words of interviewee 4:

“The current tuberculosis resolution, although enacted in 2012, was under discussion for about eleven years. During all that time we were discussing it. Instead, with this work methodology we had a new policy draft in six months.” (Interviewee 4, personal communication, October 21, 2021)

The second contribution refers to prioritising solutions according to specific challenges. The activities performed to define the challenge aided to identify smaller challenges within the broader problem. They also helped to ideate and prioritize solutions to the smaller and more relevant challenges. These activities allowed SENASA’s team to work on specific policy interventions rather than trying to find the ultimate solution to the complex problem. As interviewee 4 explained:

“The contribution which for me is the most important, was to really focus on the solutions to the most urgent problems. In general, in public administration we tend to look for the definitive solution to a problem and sometimes that definitive solution never arrives. So, in this project we asked ourselves, what can we solve now? Let us attack what we really think we can solve now.” (Interviewee 4, personal communication, October 21, 2021)

The third contribution refers to reframing policy problems and re-evaluating initial ideas thanks to better problem understanding. In this case, field research allowed SENASA’s team to gain further information about the context in which the policy was implemented. For instance, the lack of reliability of some TB-free certificates indicated a higher disease prevalence than initially expected and the need to address a control plan, instead of an eradication plan. This might signal how problem reframing – despite being very consolidated in design – is new to policy making and if adopted could impact especially policy formulation; it could allow policymakers to look at challenges from novel and unexpected perspectives. Problem reframing might also allow a quicker and less costly policy formulation process.

The fourth contribution refers to considering distinct types of policy actors and their interests in the policy formulation process. In this specific case, the characterisation of the actors interviewed in the field illustrated the variety of sanitation situations in different farms. From this insight SENASA’s team proposed a more flexible regulation which considered various levels of disease prevalence. Interviewee 4 explains this as:

“We thought that the lower the prevalence, the more incentives we must give. If you have fewer sick animals or do not have sick animals, perfect!, you do not have to ask for authorization and you will have to test every two years. Similarly, as the prevalence

increase, sanitation pressure becomes greater.” (Interviewee 4, personal communication, October 21, 2021)

Finally, the last contribution is the co-creation of a policy prototype. While not directly writing the Bovine TB policy draft document, LABgobar collaborated with SENASA’s team to prototype the regulatory framework which guided and provided input to the policy document. The prototype comprised the analysis of the current regulations and their effects, regulatory definitions that could be changed and the requirements to implement those changes. It also allowed the team to map the actors involved and constraints for short-term implementation. Building from this regulatory framework prototype, SENASA’s policymakers formulated the new regulatory policy draft.

5.2 Design limitations in policy formulation

Despite these contributions and potential benefits of implementing the new Bovine TB regulations, external and contextual factors seem to have hindered the value of design approaches for policy formulation. Some limitations identified in this case are presented below.

The first limitation is a short life cycle of the Bovine TB project’s team. Due to the change of public administration at the end of 2019, all the members of LABgobar’s and SENASA’s team were substituted. In line with the 2 to 4 years lifespan of policy labs calculated by other authors (Fuller & Lochard, 2016; Tönurist, Kattel, & Lember, 2017), the 2019 LABgobar members worked together for 4 years. This situation has direct effects on the continuity of the policy formulation process and the possibilities to make design contributions to these processes.

The second limitation is the openness and support from decision-makers. The work of LABgobar in this project was supported by SENASA’s decision-maker. Innovation units need the support of decision-makers who act as champions (Lewis, 2020) for applying design approaches in policy formulation processes. As explained by interviewee 3,

“Even internally [in the Ministry of Agriculture] we had a lot of resistance [to apply a different methodology], but when you have the approval of the directors, everything becomes easier. If you do not have leverage from whoever is leading the organization or institution, you cannot do it either.” (Interviewee 3, personal communication, September 22, 2021).

6. Conclusions

In the Bovine TB project, LABgobar introduced design approaches and methods at the earlier stages of a policy formulation process. Their activities in the “problem area” and “solution area” refer to what in design literature is known as “problem space” and “solution space” among which creative design builds a bridge, integrating various fields of knowledge (Dorst, 2019; Dorst & Cross, 2001). While some of LABgobar’s methods are common in design, many are adapted or combine various methods from other disciplines. This illustrates a methodological innovation in the space of policy formulation that brings multiple disciplines

together (Van Buuren et al., 2020). Moreover, this case suggests at least five design contributions to policy formulation. These contributions regard the structuring of a policy formulation process, prioritizing of solutions, reframing policy problems and preconceived solutions, and considering distinct type of policy actors when co-creating a policy prototype (Villa Alvarez, Auricchio, & Mortati, 2020). These contributions are constrained by some limitations such as short life span of PSI units within government and the need for openness and support from decision-makers which affect the continuity and the potential effectiveness of their work.

This paper builds on the scholarly debate about the relevance of design practices to policy formulation. For experts in this field, it describes design practices, and their value to policymakers. For practitioners, it illustrates how design methods are applied and complement policy formulation processes. Furthermore, it suggests that design promotes co-creation (Sanders & Stappers, 2008) also in the policy formulation space, reducing conflict by involving multiple actors in the process, promoting collaboration, and improving communication. Yet, this case poses further questions, for instance on the extent to which these methods should combine quantitative rigour with qualitative and empirical relevance, or the existence of specific types of policy problems that can be considered more appropriate for design methodologies. Furthermore, it is still unclear how design impact in policy formulation could be assessed, particularly, when design value is related to methodological contributions and collaboration (e.g., policymakers and policy implementers conducting research). Further research on the design work of innovation units in policy formulation will aid academic and practitioner's communities in a more robust understanding of the context, boundaries, characteristics, and value of design practices in the policy formulation space.

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