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Strengthening Rabies Prevention and Control Coordination in Maramag Municipality, Philippines

Despite national efforts, rabies remains endemic in the Philippines with significant geographical variability. This qualitative study analyzes how the municipal rabies control committee of Maramag coordinates its activities, identifies barriers and opportunities for improvement, and proposes co-constructed solutions through a participatory One Health.

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Abstract

Eliminating rabies by 2030 is a crucial goal under the third United Nations Sustainable Development Goal for health and well-being. In the Philippines, rabies remains a public health problem, particularly in semi-rural municipalities like Maramag. This study analyzes how the municipal rabies control coordination committee in Maramag functions, assessing the coherence between resources allocation and tasks distribution, harmonization of actions, and the orchestration of activities, through a participatory One Health approach. A qualitative design was used, including the analysis of official documents, 16 individual semi-structured interviews, and 3 group discussions, to map formal and informal coordination practice and stakeholder interactions. The results reveal limited involvement of actors in the animal health, education, traditional medicine, and civil society sectors. The dog population is managed by the municipal environment office, which has limited expertise in animal health. Despite the adoption of local ordinances aligned with the national legal framework, the absence of a specific framework for consultation or an integrated work plan hinders the coordination of efforts to fight rabies in Maramag. Several other factors constitue obstacles, such as the lack of education and comprehensive information on rabies among the population of Maramag, the use of dogs for medicinal and food purposes, and underfunding. The solutions co-constructed with the stakeholders focus on the creation of a municipal veterinary practice in Maramag, the revitalization of the periodic consultation framework involving all stakeholders, and the development of an integrated roadmap.

What is the Incremental Value That Makes This a One Health Case?

The One Health approach calls for participatory methods, to better understand and manage the health risks at the community level, at the actual interface between humans, animals, and ecosystems (Binot *et al*., 2015). This participation is also needed for the seamless insertion of the One Health approach within local governance structures. This case study of rabies control in Maramag highlights the importance of such multisectoral and transdisciplinary collaboration with due consideration of local administrative realities. It mobilizes stakeholders' knowledge through qualitative research methods to co-create a shared representation of rabies prevention and control at the local level. The study proposes a methodology that can be transposed to other municipalities, making it possible to map the ecosystem of institutional and non-institutional stakeholders. By highlighting the key role played by non-institutional stakeholders, this

approach reveals potential synergies that extend beyond the municipality and complement each other's actions. Finally, multi-stakeholder consultation helps to raise awareness of the 'One Health' approach among local players, encouraging them to become more involved in the fight against rabies. This case study illustrates how participatory governance and transdisciplinary work improve coordination (funding, communication, consultation) and generate concrete, locally owned solutions.

Learning Outcomes

1. Identify the main stakeholders (institutional and non-institutional) involved in rabies control in Maramag.
2. Analyze the local governance structure in Maramag to differentiate the roles, responsibilities, and influences of each type of stakeholder.
3. Analyze the harmonization of actions and the orchestration of activities within the Maramag Municipal Rabies Coordinating Committee.
4. Develop a proposal for a tool to support better coordination of stakeholders.

Background and Context

Rabies is endemic in the Philippines, killing 200–300 people each year (Barroga *et al*., 2018a,b). In 2018, the epidemiological situation indicated a gradual increase in the incidence of dog bite cases from 176,501 animal bite cases reported in 2007 to 1,156,377 cases (Fig. 1) and the incidence of canine rabies from 285 to 1227 cases (Fig. 2) according to the National Rabies Prevention and Control Program (NRPCP).

The extent of the problem varies considerably from one locality to another. In the municipality of Maramag, the apparent incidence of dog bite victims in 2020 was 23.6% with animal bite treatment centers reporting about 2000 cases annually (Obedencio *et al*., 2020). The Government of the Philippines has set a national target for rabies elimination by 2030 through the passage of the Rabies Control Act (RCA) and the creation of the NRPCP. This legal framework allows municipalities to tailor their programs to their resources to achieve their goals. Despite marked improvements, rabies persists, largely due to challenges in surveillance of the disease in animals and coordination between the human and animal health sectors (Barroga *et al*., 2018a,b), variable capacity at the barangay level, and limited feedback loops between local implementation and municipal planning.

The challenge of coordination was the focus of this study. Coordination has been classically defined as an activity carried out in an organization, when the work to be done is divided between several individuals with a common goal (Mintzberg, 1979), involving either the integration of separate activities or the facilitation

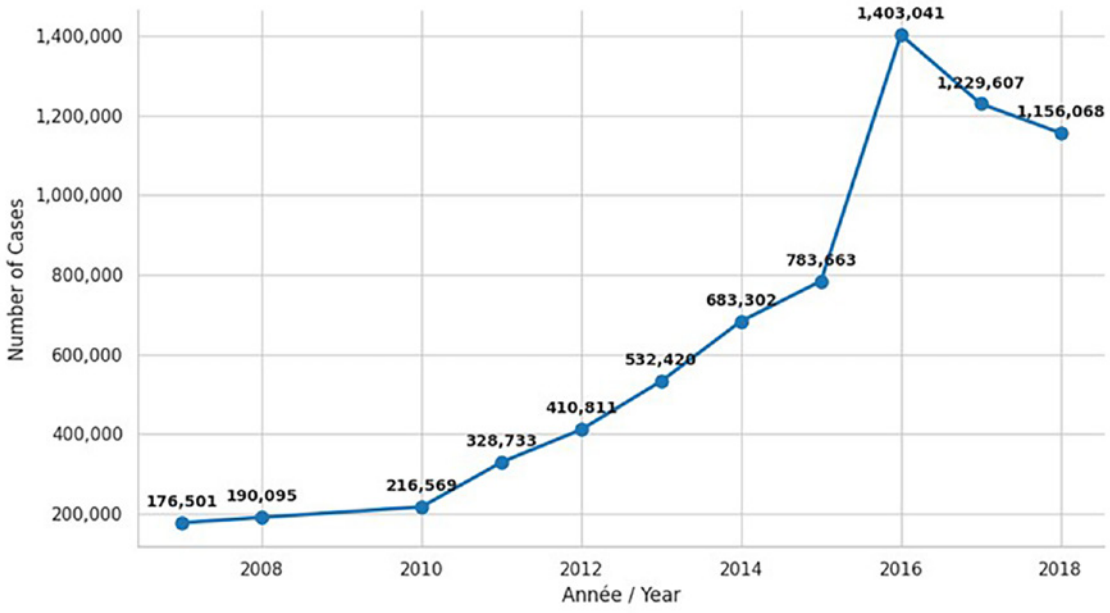


Fig. 1. Animal bite cases, Philippines, 2007–2018.

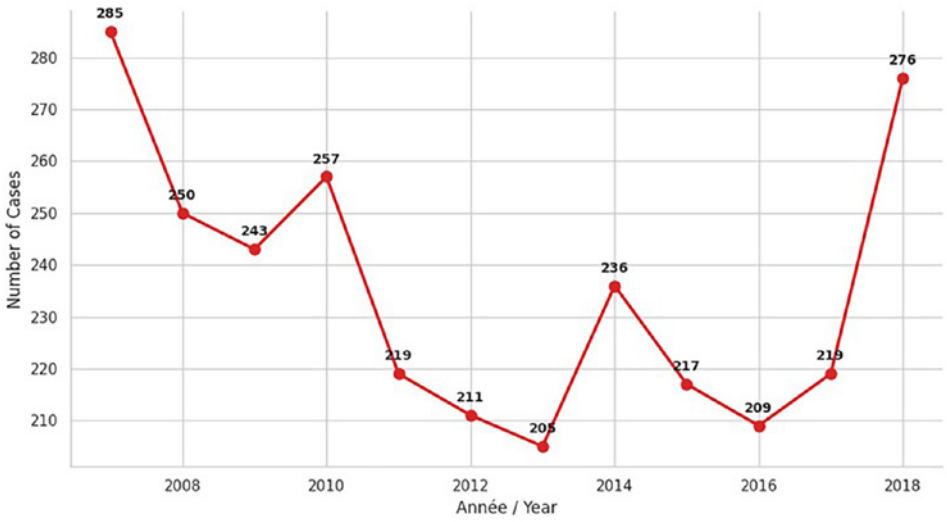


Fig. 2. Human rabies cases incidence, Philippines, 2007–2018.

of interrelated activities (Malone and Crowston, 1994). Alsène and Pichault (2007) propose to consider coordination as the "search for coherence" in the work accomplished by a group of individuals. This notion subsumes those of integration and facilitation. It covers in practice the distribution of resources (human, material, and financial) and tasks, harmonization of actions, and orchestration of activities, taking account of their interdependencies. Resource and task allocation pursues not only goals of efficiency but also equity. Harmonizing actions consists of aligning the actions of everyone, their goals, and modalities, so that everyone works in the same direction with compatible methods. Finally, the orchestration of activities consists of structuring and arranging actions so that individual efforts complement each other in a timely manner to contribute efficiently to the result. The coherent articulation of these three dimensions of coordination is basically conditioned by dedicated funding and by means of communication and consultation. These three conditions thus appear as levers for the improvement of coordination. Coordination efforts also gain from including private actors in well-designed and followed-up public-private partnerships (Poupaud *et al*., 2021).

A visualization of the conceptual framework of coordination mobilized for this study, showing its 3 dimensions (purple), each being operationalized through 3 adjacent components to be investigated (green). The 3 conditions or levers for improvement (pink) are positioned intermediary between the dimensions they are thought to influence more centrally. (Visual produced with free online software www.hexx.it).

Transdisciplinary Process

The study took place from April 17 to May 28, 2023 in Maramag, which is a 1st class municipality[1] made up of 20 barangays,[2] subdivided into 20 puroks,[3] located in the province of Bukidnon, in the northern part of the island of Mindanao in the Philippines. Our key informants were interviewed in 6 barangays, 3 of which were urban (North Poblacio, South Poblacio, Dologon) and 3 rural (Dagumba-An, Panalsalan, La Roxas). These barangays were chosen because of the high incidence of dog bites according to a previous study conducted in the municipality (Obedencio *et al*., 2020). Participants were selected using the snowball sampling method (van Meter, 1990) until saturation point was reached. The initial sampling started explicitly from institutional stakeholders (Mayor then Municipal agriculture and health officers), as per the composition of the municipal coordinating committee established by the NRPCP 2020–2025 strategic plan.

Participatory methods were used to identify the strengths and weaknesses of the municipal coordination structure. This identification was triangulated through a set of analyses, including deductive thematic analysis, the CATWOE grid extracted from the Soft System Methodology (Checkland and Scholes, 1999) to clarify actor perspectives, and a combination of PESTEL and SWOT methods (Sansa *et al*., 2021) to assess external influences and internal capacities.

Data analysis followed a deductive thematic approach, guided by the conceptual framework of coordination (Fig. 3). Transcripts from interviews and group discussions were coded iteratively by three analysts using an agreed codebook (coordination levers, resources/tasks, harmonization, orchestration, barriers/enablers).

Fig. 3. Conceptual framework for coordination.

Discrepancies were resolved by consensus, and illustrative quotes were used to validate interpretations during feedback sessions. Data collection included 16 face-to-face in-depth individual interviews with stakeholders, using a non-directive semi-structured interview guide, to understand the allocation of human and material resources and to gather suggestions for improving coordination. Three group discussions were also organized in the rural barangays of Dagumba-An and the urban barangay of Dologon, and the third at Maramag town hall, bringing together all the stakeholders from our previous interviews using a discussion guide. The sought-after information covered the alignment of stakeholders' actions and the way in which these actions are structured to complement each other. Finally, this approach enabled the emergence of co-constructed solutions for better rabies control such as technical the data sheet designed to structure the quarterly meetings of the municipal rabies control committee in Maramag.

Respect for the principles of confidentiality and anonymity was guaranteed using information leaflets and informed consent forms. Interviews lasted on average 60 min and focus groups 90 min, mainly in English and Visayas.[4] The research team was assisted by a translator for this purpose.

The open investigation approach highlighted elements pertaining to the socio-ecological context, revealing the complex links between man and dog. These links manifest themselves in emotional attachment, food, and medicinal use of dogs in certain localities, and are influenced by the perception of the risk of rabies. On the overall, the coexistence of owned, stray, and feral dogs and inequalities in access to care have proved to be decisive factors sustaining transmission risk.

An iterative coordination process is being implemented by the rabies control committee. This process, based on funding, communication, and consultation, makes it possible to design targeted interventions and assess their impact. It is led by a multi-disciplinary team involving both formal (such as representatives from the municipal government, health, and agriculture offices) and informal players (such as traditional healers and community-based associations).

This quest for coherence illustrates the value of uniting concepts, methods and experts from animal, human and environmental disciplines with those from primary and university education, safety, communication and policy to implement efficient programs (Lapinski *et al*., 2015) (Fig. 4).

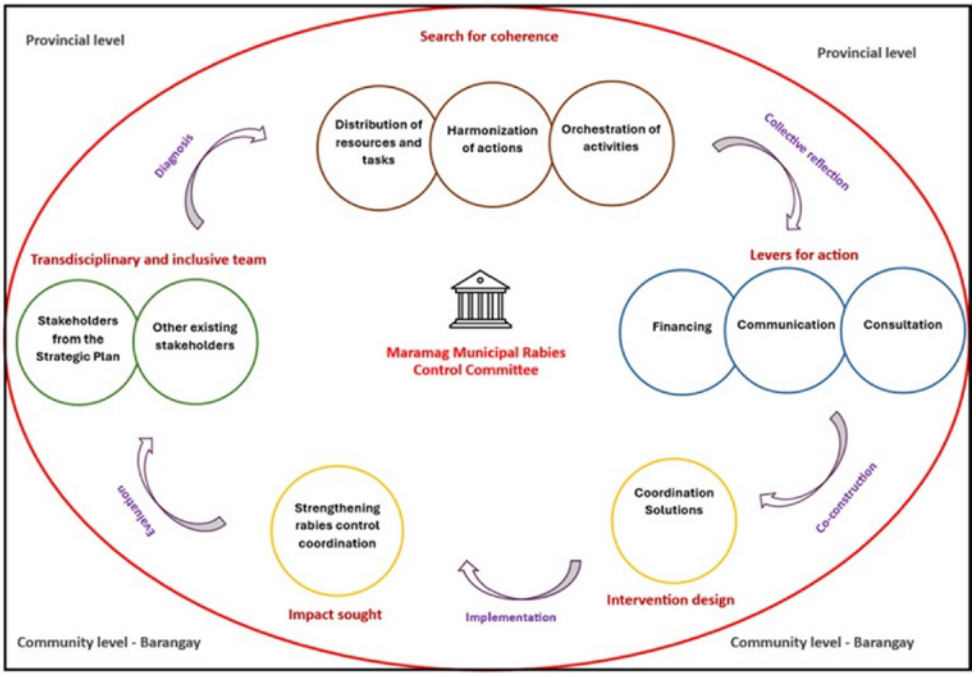


Fig. 4. Transdisciplinary process of rabies control coordination in the municipality of Maramag (from problem scoping to planning, delivery, review). This diagram highlights the interactions that influence the operation of the municipal coordination committee for rabies control.

Project Impact

Prior to the in-depth analysis of this study, the committee's activities, while existing, lacked efficiency. Actions were often fragmented, with, for example, vaccination campaigns conducted by the agriculture office without sufficient communication with the Animal Bite Treatment Center (ABTC) of the health office. The budget was insufficient for comprehensive canine vaccination coverage, and there was no integrated work plan to guide and synchronize the efforts of the various actors. The analysis carried out by the research team revealed synergies and complementarities between existing rabies control interventions. Furthermore, during the study, local stakeholders were made aware of the One Health approach, which could lead to greater efficiency in achieving the goal of eliminating rabies by 2030 through enhanced collaboration. The establishment of contacts between formal and informal stakeholders has improved communication, which would ultimately help amplify the messages of the One Health approach, making it more legitimate, more visible, and more likely to be applied in other public health projects.

Stakeholder mapping: A broad network for collective action

The study identified a wide range of actors involved in rabies control in Maramag, going beyond the usual institutional actors. This inclusive mapping highlighted the crucial role played by non-institutional actors, such as traditional healers, community-based associations, the private sector, and the Central University of Mindanao (CMU) (Table 1). Fig. 3 shows how actors at the provincial (purple), municipal (red), and community (grey) levels interact. Institutional actors are represented by solid nodes, and non-institutional actors by bull's-eye nodes. The figure highlights how coordination depends on the quality of links among these different levels.

The CMU and the municipal agriculture and health offices play important bridging roles. They connect actors who would otherwise work separately, such as private veterinarians and traditional healers. Strengthening these links reduces overlap between activities, for example, between vaccination campaigns and community education, and helps information from the barangays reach the coordination committee more quickly.

Some actors are peripheral but influential. Barangay leaders, women's groups, pet-owner associations, and traditional practitioners may not be at the center of decision-making, but they strongly influence community

Table 1. Identification of stakeholders involved in rabies control in Maramag using the snowball sampling method.

Primary source		Secondary source	
chair/vice-chair	Members	Institutional	Non-institutional
Mayor Municipal agriculture office Municipal Health Office	Police Epidemiological surveillance office Barangays captains	Municipal environment office Animal bite treatment center (ABTC) Municipal pound Central Mindanao University (CMU)/ elementary school Provincial veterinary office of Bukidnon and Agusan Del Norte Private veterinarians Barangay advisors President of puroks Barangay health workers	Veterinarian's association Parents, pet owners, women's association NGO (NFA, Eagles club) Traditional practitioners Dog bite victims

behavior. Their involvement in quarterly forums and barangay micro-plans encourages higher vaccination coverage, faster post-exposure treatment, and better respect of leash and registration rules.

The provincial veterinary services provide technical support and additional resources when needed. Establishing a more formal link with the municipality, through shared templates and joint progress reviews, will help standardize indicators and encourage exchange of experience between municipalities.

Orchestration of activities: A synergy to be strengthened

The Philippines is decentralizing rabies management, assigning responsibilities to municipalities. Local ordinances have been adopted, but their application varies from one barangay to another, reflecting disparities in the operational capacity of the various players. Collaboration is limited in the absence of a specific consultation framework for rabies control. The NRPCP's results indeed suggest that need for better coordination between the different levels of planning.

The municipality, mandated by the government, has set up a coordination committee for the prevention and control of rabies on its territory. This committee brings together the institutional players in the Local Government Unit (LGU). Although the involvement of the various stakeholders is visible, certain key sectors such as animal health and education are under-represented. A budgeted and inclusive operational work plan could facilitate the coordination of actions and optimize the use of resources, thus contributing to greater congruence between the set objectives and the achieved results. There is a need to harmonize sectoral plans as well as indicators for monitoring and evaluation, also considering the voice of communities. Stakeholders identified the need for the creation of a municipal veterinary office to manage the dog population, coordinate interventions, optimize resource management, and centralize data. They also recommend formalizing exchanges between barangays, bite-case referral, and data sharing to strengthen orchestration.

Harmonization of procedures: The quest for greater consistency and efficiency

At the municipal level, the mayor, assisted by the heads of agriculture and health, coordinates the fight against rabies. In the villages, however, this responsibility falls to the barangay captains. The CMU transfers skills by training people in the various aspects of rabies control, including community training (bite prevention, responsible pet ownership and vaccination), as well as capacity building (vaccination micro-planning, dog-population management techniques, data recording) for local health workers through academic extension. It also provides technical support for dog vaccination and castration campaigns. Fig. 5 provides stakeholders map, refined from the initial institutional committee composition, offering a

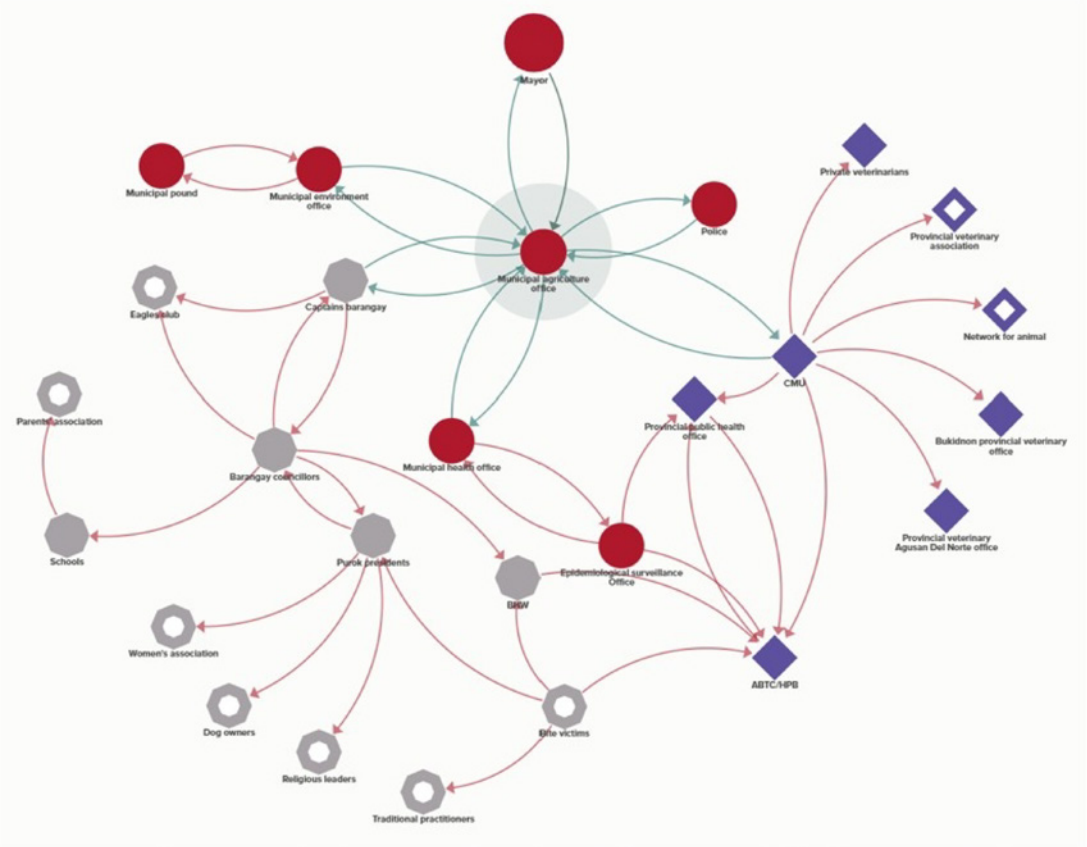


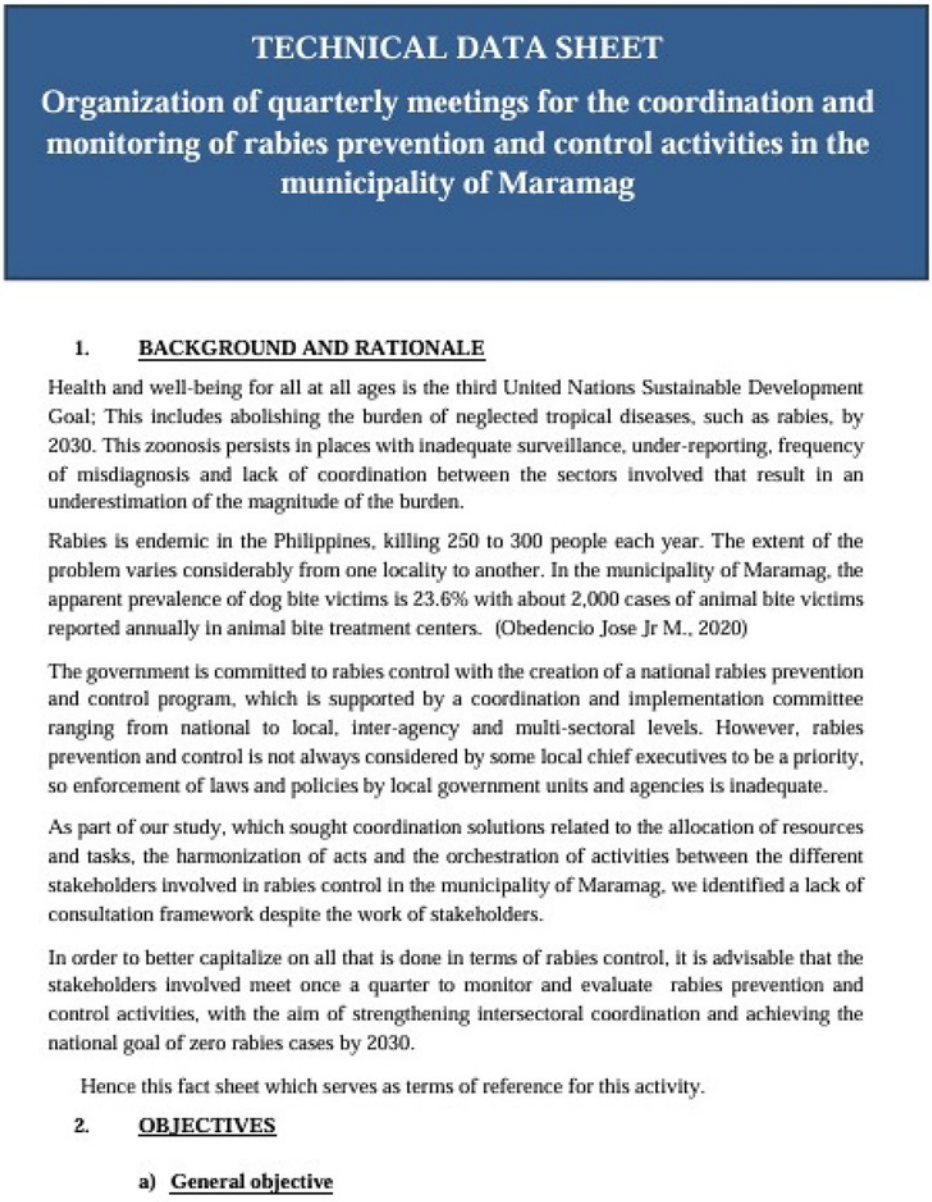
Fig. 5. The dynamics of coordination and relations between the various stakeholders of the municipal rabies coordination committee in Maramag. The colored nodes represent the provincial (purple), municipal (red) and community (gray) levels. On the community level we also have the Institutional (solid forms) and non-institutional (bull's eye forms) stakeholders represented.

broader view of the actors involved in rabies control in Maramag. These complex relationships highlight a dispersion of efforts, despite interconnections between provincial, municipal, and village levels. The map also highlights the role played by informal connections and by a CMU-brokered network, connecting to private actors.

A broad participatory approach would enable the municipality to remove the barriers between the various players, such as community leaders (barangay captains, purok presidents), professional veterinary associations, dog owners and traditional healers. The latter, deeply rooted in local communities, could make an essential contribution, particularly in isolated rural areas. In addition, the CMU's network extends as far as the province of Agusan Del Norte, including provincial veterinary services and private practitioners, opening possibilities to facilitate inter-provincial learning.

Project Outlook

As a direct product, this study helped establish a data sheet designed to structure the quarterly meetings of the municipal rabies control committee in Maramag, to support the co-designed strategy for a better coordination. This data sheet includes key indicators for monitoring vaccination campaigns, bite cases, educational activities, and resource status. Regarding the missing budget and work plan, the next step, facilitated by this tool, will be the development of a budgeted and integrated action plan during upcoming committee meetings (Fig. 6). This practical tool will make it easier to monitor progress, identify obstacles and define corrective actions. This practice would gain impact from an application at the level of the barangays, which are the real interface for operationalizing rabies control activities as close as possible to the beneficiaries. This capacity-building of barangays is especially key to spur the needed participation of communities and traditional/informal actors. Finally, the adoption of common frameworks and tools for monitoring and evaluation at the various relevant levels as well as in connected municipalities and provinces may facilitate an exchange of experience to promote peer learning.



TECHNICAL DATA SHEET

Organization of quarterly meetings for the coordination and monitoring of rabies prevention and control activities in the municipality of Maramag

1. **BACKGROUND AND RATIONALE**

Health and well-being for all at all ages is the third United Nations Sustainable Development Goal; This includes abolishing the burden of neglected tropical diseases, such as rabies, by 2030. This zoonosis persists in places with inadequate surveillance, under-reporting, frequency of misdiagnosis and lack of coordination between the sectors involved that result in an underestimation of the magnitude of the burden.

Rabies is endemic in the Philippines, killing 250 to 300 people each year. The extent of the problem varies considerably from one locality to another. In the municipality of Maramag, the apparent prevalence of dog bite victims is 23.6% with about 2,000 cases of animal bite victims reported annually in animal bite treatment centers. (Obedencio Jose Jr M., 2020)

The government is committed to rabies control with the creation of a national rabies prevention and control program, which is supported by a coordination and implementation committee ranging from national to local, inter-agency and multi-sectoral levels. However, rabies prevention and control is not always considered by some local chief executives to be a priority, so enforcement of laws and policies by local government units and agencies is inadequate.

As part of our study, which sought coordination solutions related to the allocation of resources and tasks, the harmonization of acts and the orchestration of activities between the different stakeholders involved in rabies control in the municipality of Maramag, we identified a lack of consultation framework despite the work of stakeholders.

In order to better capitalize on all that is done in terms of rabies control, it is advisable that the stakeholders involved meet once a quarter to monitor and evaluate rabies prevention and control activities, with the aim of strengthening intersectoral coordination and achieving the national goal of zero rabies cases by 2030.

Hence this fact sheet which serves as terms of reference for this activity.

2. **OBJECTIVES**

a) **General objective**

Fig. 6. Technical data sheet, organization of quarterly meetings for the coordination and monitoring of rabies prevention and control activities in the municipality of Maramag.

Limitations

Because of the specific realities of the municipality and its population, the generalization of the conclusions of this study is limited. Snowball sampling from institutional starters risks selection bias, as participants are likely to nominate contacts within their own networks, potentially excluding other relevant actors. In addition, integrating the interests of the various stakeholders, despite their common objective, and overcoming inter-actor suspicions represented a challenge. Mixed-group discussions limit within-group comparisons. These difficulties were, however, mitigated during the study by triangulation of interviews, documents, and group discussions and a substantial investment of time and effort, fostering mutual understanding.

Conclusions

The study reveals that the mapping of local stakeholders, both formal and informal, and connecting them through routine consultation is essential to promote a participatory and inclusive approach. This process improves clarity on who does what, when, and with what resources. In addition, making the most of private

sector and civil society players helps to capture stakeholder knowledge and mobilize additional resources to increase funding for rabies control, thereby fostering new interdisciplinary public-private partnerships. Finally, the recognition of the role of communities and the valorization of indigenous knowledge by public authorities would strengthen mutual respect between conventional health systems and traditional medicine. Renewed coordination mechanisms between these players are needed to ensure that their efforts converge toward the common goal of eliminating rabies by 2030. The solutions that emerged from participatory discussions with local stakeholders highlight the need to set up a municipal veterinary practice in Maramag, to revitalize a regular consultation framework through the active involvement of all stakeholders, and to draw up an integrated roadmap for Maramag. These actions would gain from a common monitoring and evaluation framework facilitating peer learning across municipalities and provinces.

Group Discussion Questions

- How can the One Health approach, integrating human, animal, and environmental health, be adapted and applied in different municipal contexts to overcome barriers in rabies control?
- What strategies can be implemented to effectively integrate non-institutional actors (such as traditional healers, community associations, and the private sector) into local governance frameworks for zoonotic disease surveillance and control?
- How can community engagement be strengthened to ensure the participatory planning, implementation, and evaluation of rabies prevention and control activities, particularly in resource-limited settings?

Notes

[1]First class municipality is a term used in the Philippines to describe a municipality that has an annual revenue of at least 50 million pesos and meets other requirements such as population size and land area.

[2]The smallest administrative unit corresponding to a ward, district, or village.

[3]A territorial enclave that is part of a barangay.

[4]Local language commonly used in the province of Bukidnon.

Conflict of interest

The authors have no conflicts of interest to declare.

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