Technology for improving efficiency and welfare during street dog sterilization

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HUMANE SOCIETY INTERNATIONAL

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Street Dogs in India

Definition: Dogs that live in the streets, breeding and surviving successfully on the street. Unowned but are commonly fed by individuals, households and communities they live around.

Population: There are 62 million (4.5 dogs per 1000 humans) estimated street dogs in India. *(Humane Society International (HSI), Unpublished data)*

Conflict: Street dogs are also known to carry various zoonotic diseases such as rabies, posing a high risk to public and dog population health. The annual estimated number of dog bites in India is 17.4 million, leading to estimated 18,000-20,000 cases of human rabies per year. (*Gongal G, Wright AE. Human rabies in the WHO Southeast Asia region, Prev Med 2011)*

Existing Laws in India

- In India, Animal Birth Control Rules, 2001 is a specific law providing legal protection to street dogs against relocation, removal, killing and poisoning. ABC 2001 rule suggests to local authorities how to deal with street dogs by only adopting spay/neuter and return method and prohibits harsh actions including relocation. [ABC Law 2001].
- Prevention of cruelty to animal act, 1960 also provides legal protection to animals from any type of cruelty in India [Act 1960].

Street Dog Sterilization Programs in India

- In the last two decades, street dog population management through the Catch – Neuter – Vaccinate – Return (CNVR) method has become common practice in several cities in India (post ABC 2001 law).
- Most CNVR programs are run with limited resources and a traditional way of data recording (on paper) for street dog catching location, surgery data, post operative care data and returning the dog back to the catching location .
- Street dogs are territorial, and they live in a particular area with a specific group of the dogs. They protect their territories from intruders by violence, intimidation, frames, biting and combat. A dog on its own territory, male or female, was likely in the non-breeding season to attack strange dogs of both sexes (Banerjee *et al*,2020).
- Failing to return a street dog to its caught location post CNVR creates several welfare issues, and it is like losing a home.

Existing Problems

- According to ABC law 2001, local government authorities bear the cost of street dog sterilization, a fixed amount per dog sterilization is given to NGOs at the end of each month. For which authorities need verifiable data.
- For a street dog population management program to be effective, it is essential that at least 90% of female dogs in an area are sterilised.
  (standard operating procedure for sterilization of street dogs, AWBI 2009)
- Record keeping on paper sheets makes it difficult to have a scientific and planned catching approach for the area/city.
- Street dog sterilization programs have been questioned on several accounts – Number of dogs sterilized, catching location/area and returning location/area.

Existing Problems

- Relocation of street dogs is common during the sterilization process.
- People who feed street dogs in a community report on missing dogs during sterilization program, sometimes pups and mother get separated due to inaccurate returning.
- Authenticity – There is no digital way to verify number of dogs sterilized per month for an area/city.

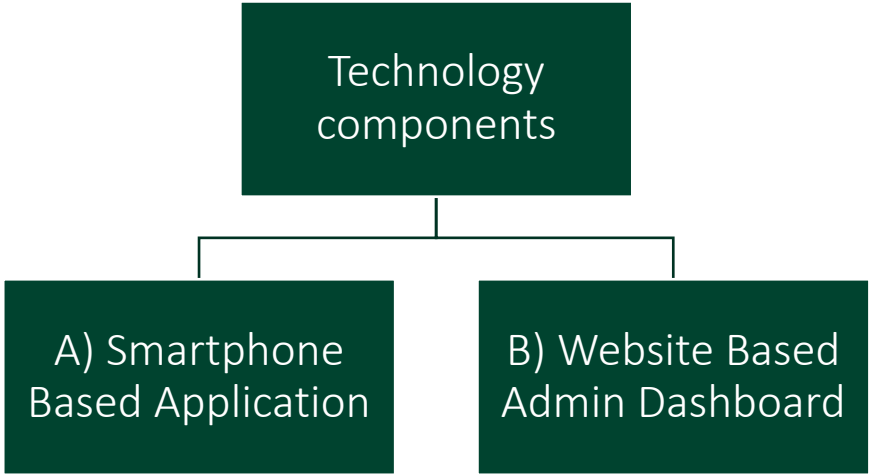
Existing Problems → Lack of trust between NGO – Government - Citizen

Results in → • Poorly funded program • Media criticism

No Impact → Decades long program without noticeable impact

Solution

Technology Developed by Humane Society International (HSI)

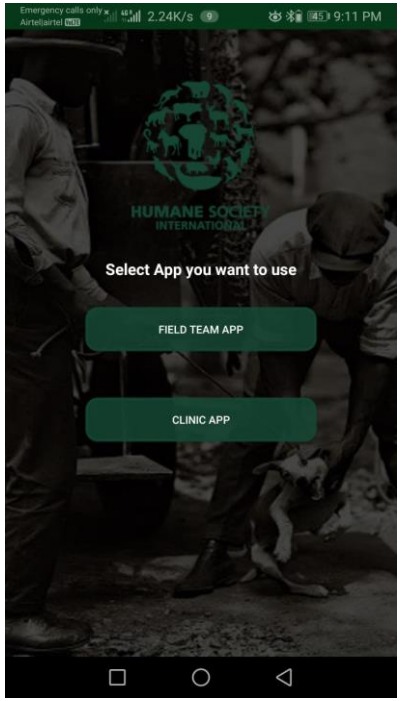


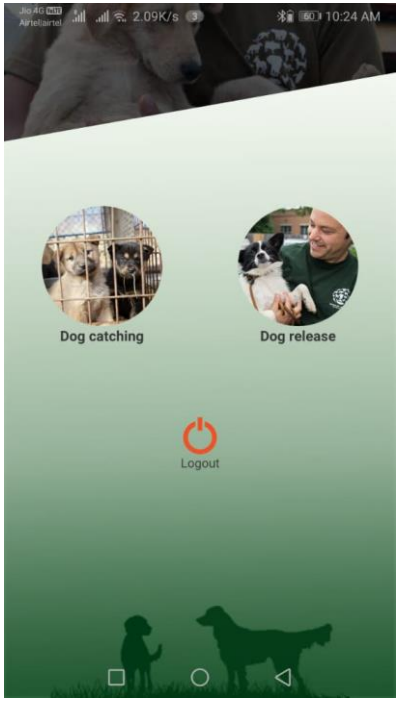
A) Application helps field officers in collecting street dogs catch data and navigates for returning street dogs to their original location.

B) Online Dashboard helps program manager to monitor various activities and produce reports in different formats.

Solution

A) Application - To replace the traditional paper sheet for data keeping



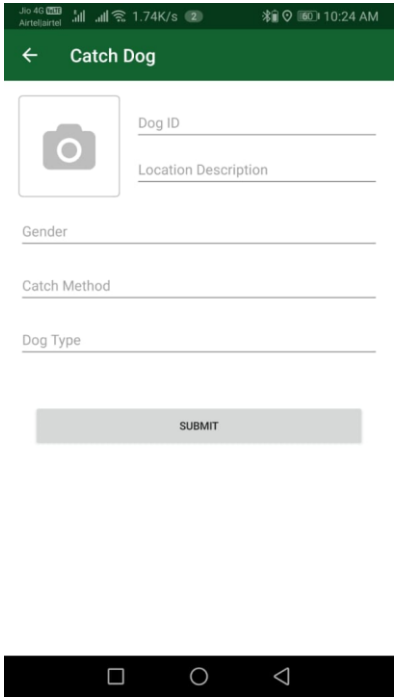


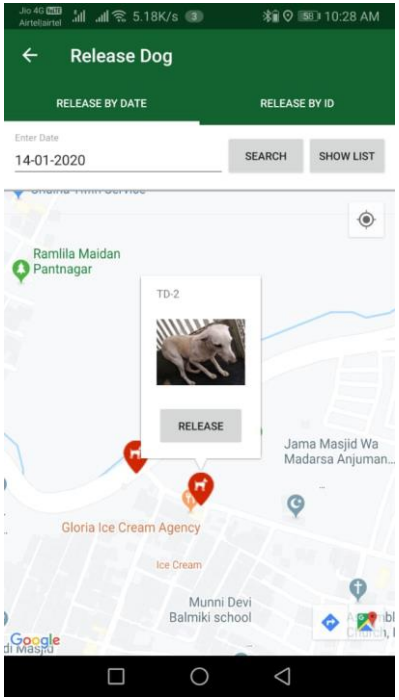
Screenshots of smartphone application (Option selection screens)

- Replace the dog catching paper record sheet with digital data.
- Geofencing based catching to saturate sterilisation coverage for an area.
- Map for field staff to review catching activities of the day.

Solution

A) Application - For field user (For Catching – Returning Street Dogs)





It records GPS location, Picture and Details of the street dog upon catching

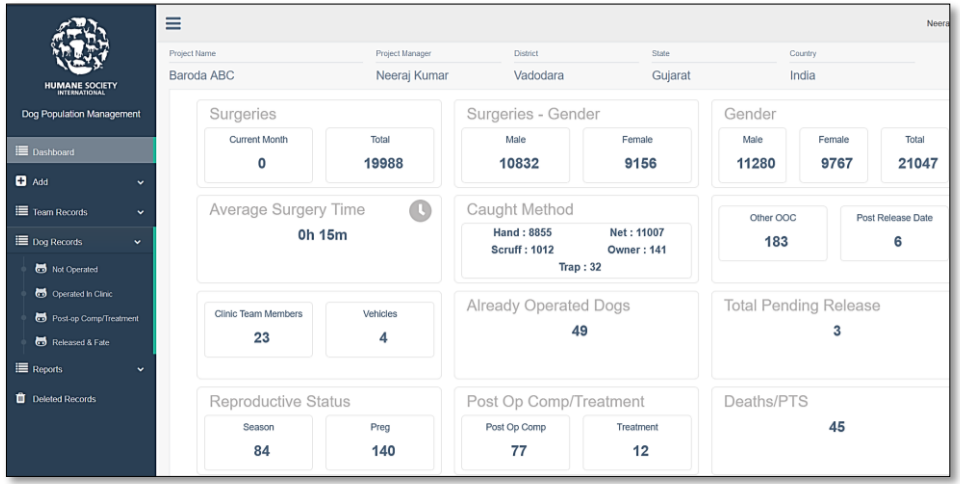
Navigates field user to return dogs back to the original location

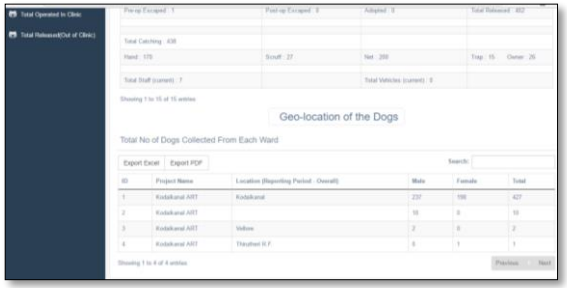
Collect data offline and upload to server upon internet connection

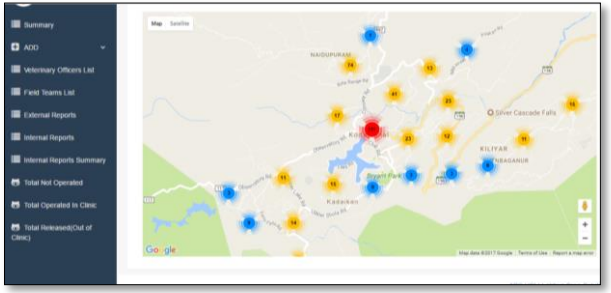
Screenshots of smartphone application (Catching screen and Returning screen)

Solution

B) Online Dashboard- For manager







- Dashboard helps tracking program's activity on single click.
- Map view helps in planning area-wise sterilization.
- It generate reports in PDF, and Excel format
- Stores picture , catch detail, surgery detail and post operative care detail for each dog.

Data collected/recorded using technology

Since 2016, Humane Society International sterilised more than 100,000 street dogs using SETU application at more than ten locations in India. Street dog sterilisation data captured using SETU application are presented here.

Street dogs have one breeding cycle (monoestrous), which peaks post monsoon during August to December, with peak pup proportion following January to March.

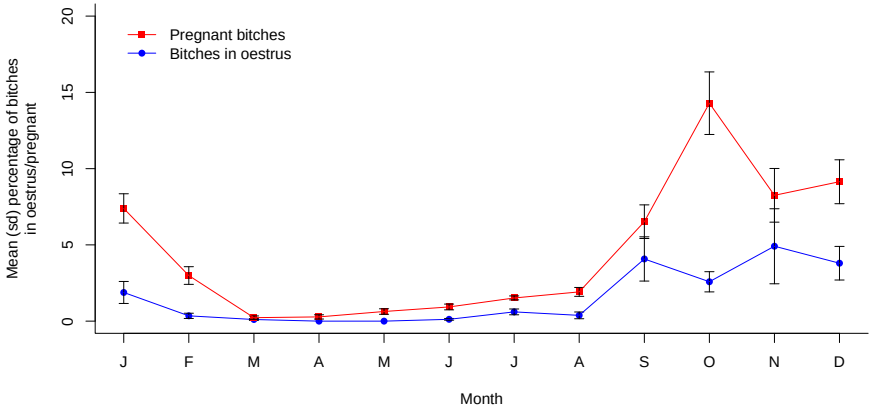


FIGURE 1. Mean (sd) proportions of bitches in oestrus and pregnant in Vadodara, India between 2017 and 2021 (n=8860)

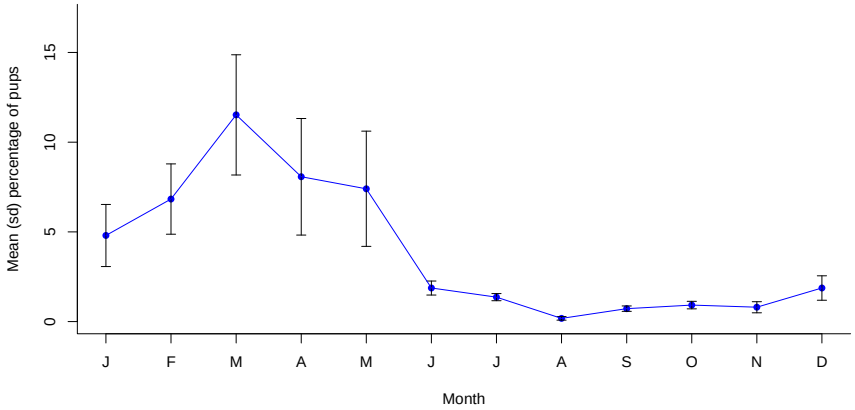


FIGURE 2. Mean (sd) monthly proportion of pups in Vadodara, India between 2017 and 2021 (n=19978)

Data collected/recorded using technology

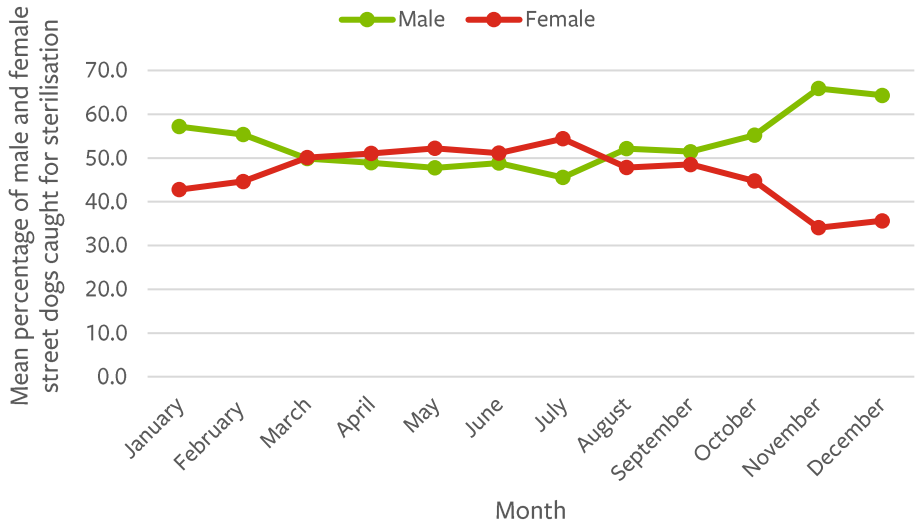
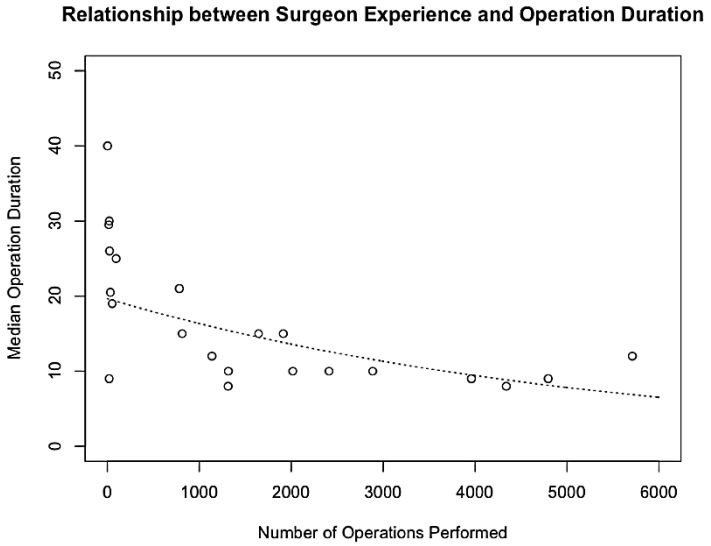


FIGURE 3. Mean monthly proportion of male and female street dogs caught in Vadodara, India between 2017 and 2021 (n=20545)

- Street dog catch ratio for male : female is dependent on breeding season. During peak pregnancy and lactation season fewer female street dogs are fit for surgery and therefore fewer female dogs are caught for sterilisation.
- The higher the proportion of female dogs sterilised in the population, the better the population control results will be.
- As shown in the Figure-3 March to September are the months to focus on female dog sterilisation.

Data collected/recorded using technology

SETU online dashboard allows recording of surgeon name, surgery duration and post-surgery complications. These helps in tracking each surgeon's performance as well as producing comparative data sets for better understanding of various relationships.



A clear negative relationship can be observed between surgeon experience and operation duration.

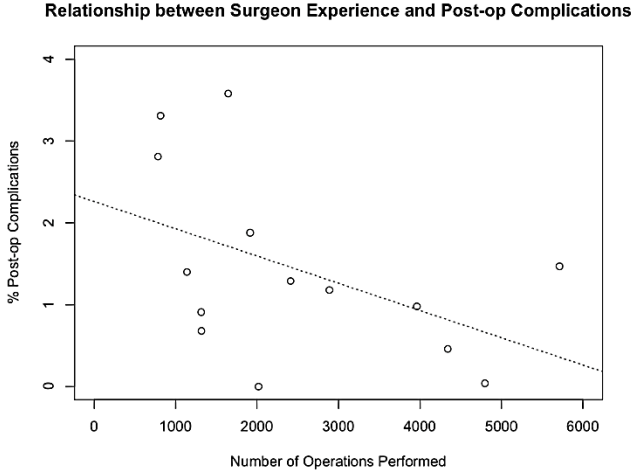
An exponentially-fitted model was tested:
Multiple R-squared: 0.4298
Adjusted R-squared: 0.4012
F-statistic: 15.07 on 1 and 20 DF
p-value: 0.0009261

There is a significant negative exponential correlation between a surgeon's operational experience and the average (median) duration of their operations.

Data collected/recorded using technology

Post-op complications and death based on surgeon experience

Rho = 0.586, S = 188.24, p-value = 0.02756



Rho = 0.838, S = 73.811, p-value = 0.0001837

There is a significant correlation between surgeon experience, post operative complication and death rates. On average, surgeons who have performed more operations exhibit a lower rate of post-op complications and deaths.

Discussion and Conclusion

- The technology could play a critical monitoring role in the street dog sterilisation process and provide a verifiable accountability tool to managers. Various data collected using the SETU application helps in constant data analysis and can improve program implementation efficacy.
- Accurate return of street dogs post sterilisation improves street dogs' welfare during the program and is supported by dog feeders and communities.
- Map-based street dog catching, and return improve the area-by-area sterilisation coverage, which helps achieve required high sterilisation in an area.
- SETU application captures each dog's photo, location, and data in digital format, increasing the program's authenticity and gaining support from local media and governments. This results in a sustainable program.