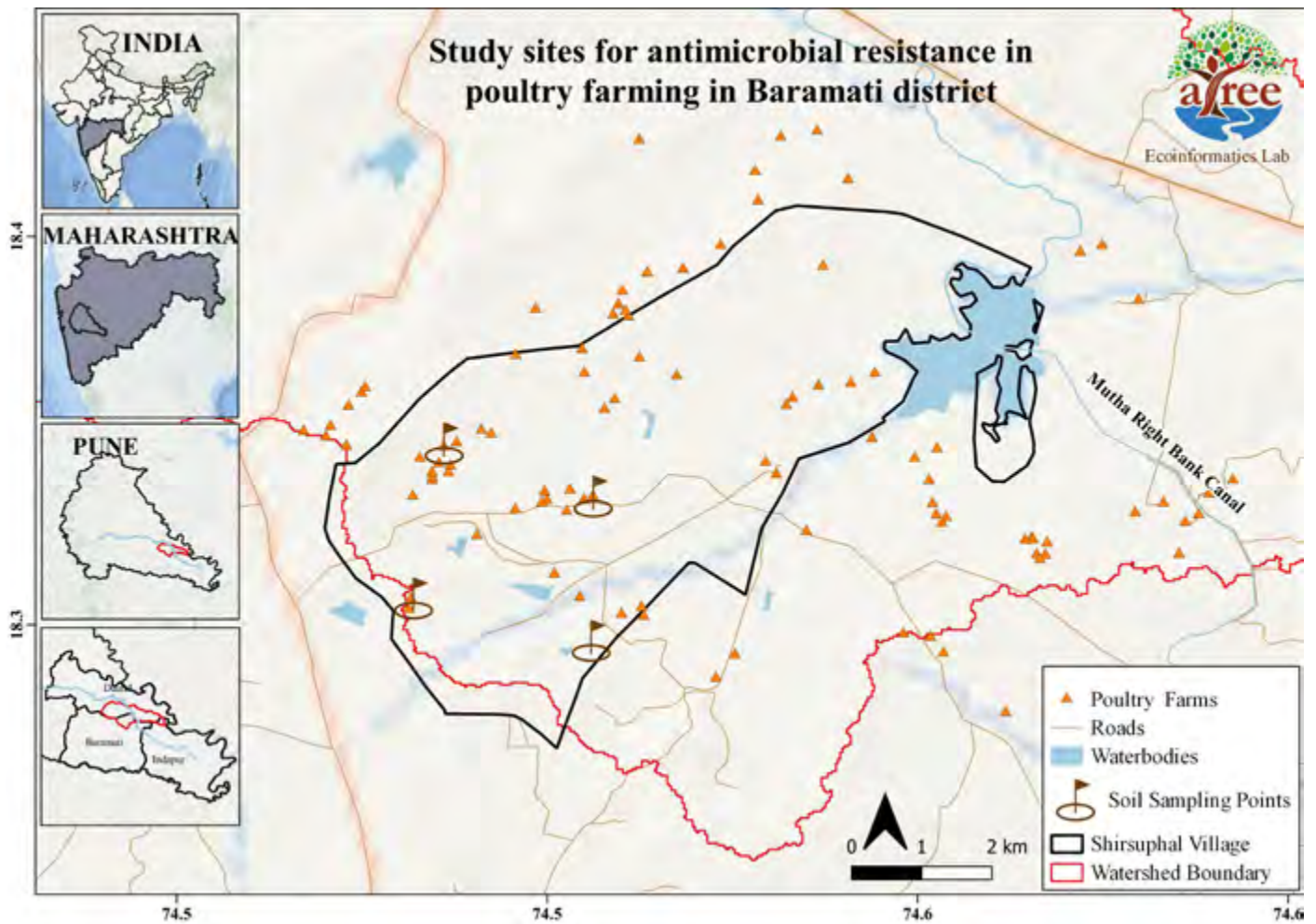




Combating antimicrobial resistance in poultry



Baramati Town and Shirsuphal Village



Executive Summary

An increase in market demand for poultry is driving indiscriminate use of antibiotic agents. Exposure to antibiotics reduces animal and human immunity to currently curable diseases, a phenomenon known as antimicrobial resistance. Unchecked antibiotic use results in environmental contamination through poultry waste and effluents, affecting farms as well as their surroundings. The resulting antimicrobial resistance renders human farmers, their neighbours, as well as consumers, more vulnerable to outbreaks of mutant diseases.

This policy brief describes investigations of the environmental conditions in poultry farms in Baramati district of Maharashtra. Based on the findings, it outlines measures to combat antimicrobial resistance in poultry farm environments by:

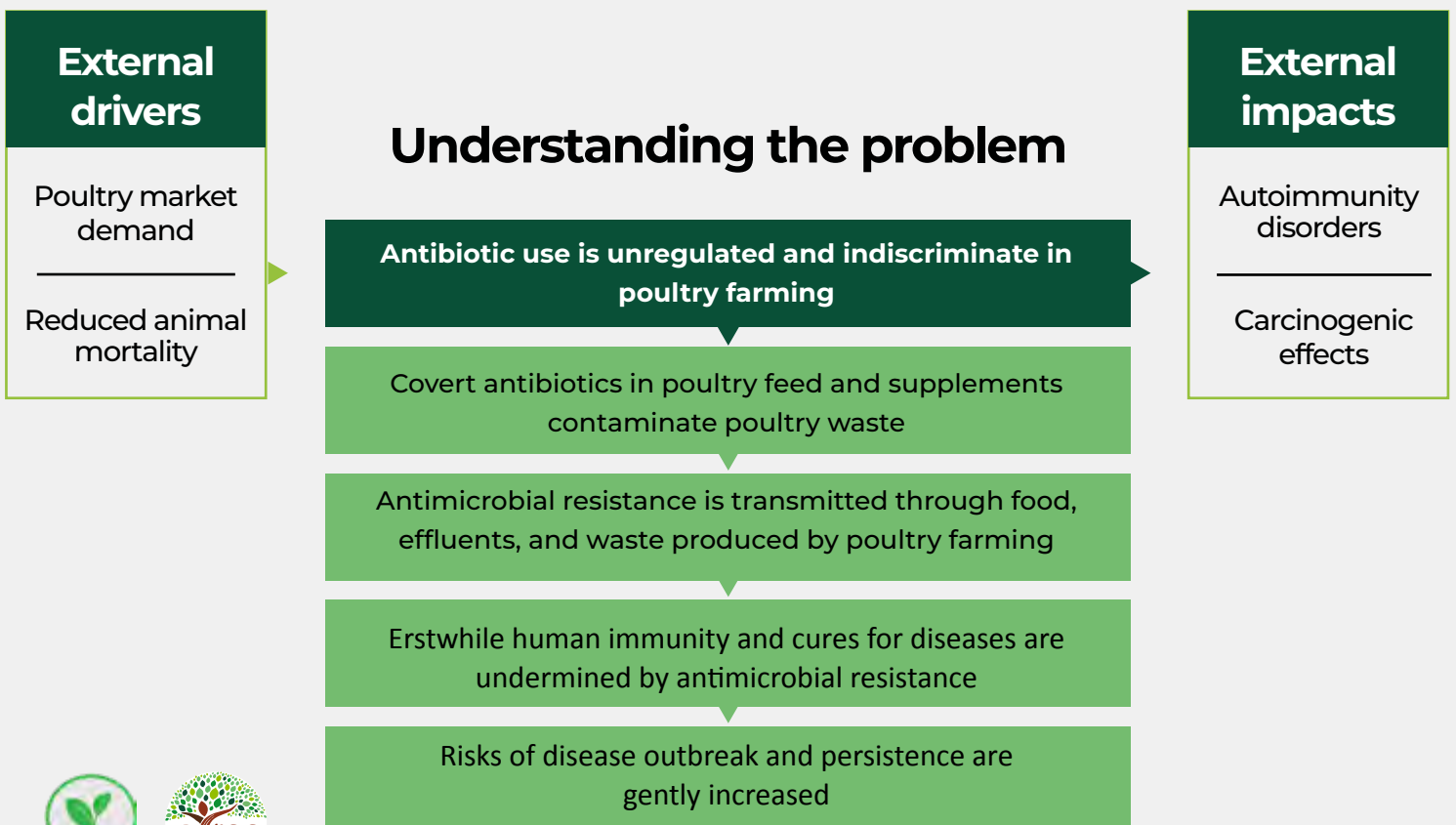
1. Enforcing environment and food safety guidelines
2. Empowering farmers to reduce antibiotic use
3. Engaging agencies in antimicrobial resistance monitoring

What is the Problem



Poultry intensification in recent years has led to an increased use of antibiotic agents to improve productivity. Antibiotics can combat disease in poultry, but they are being misused as therapeutics to prevent animal mortality in general. This means, even in the absence of disease, antibiotics are introduced into poultry feed and supplements as a preventative measure. Antibiotic use, whether preventative or curative, has several negative downstream consequences. In addition to reducing the overall health of the animals, antibiotics contaminate the environment through their waste and by-products. As a result, various micro-organisms, animals, and human beings in the proximity of antibiotics develop antimicrobial resistance. Antimicrobial resistance in turn makes animals and humans more susceptible to diseases that are incurable or rapidly transmitted. In the long term, this can lead to autoimmune disorders and carcinogenic effects.

Severe water scarcity in the last decade in the region of Baramati in Pune district, Maharashtra, has led to a significant increase in the poultry industry. This industry has compensated for the loss in agriculture and served as an additional source of income for the farmers. We selected the catchment of Shirsuphal village in Baramati Taluk (sub-district) to study the impact of poultry expansion on the environment.



The Research

Introduction

A pilot study was conducted to assess the prevalence of antimicrobial resistance in the rapidly developing Baramati catchment in Western India. In the last decade, the number of poultry farms has increased substantially, with over 100 farms in the vicinity of Shirsuphal village. The village has a human population of 5512 according to the public census 2011. The area is primarily a savannah with plateau highland and plains. Agriculture is the major occupation of the villagers, with sugarcane, maize and vegetables as the major cash crops.

Methods

Four sub-catchments were sampled, namely areas with:

- a) dense poultry farms (4 farms/km²),
- b) sparse poultry farms (2 farms/km²),
- c) agricultural fields and
- d) habitation (village).

Environmental samples of soil, litter, and water were subjected to Kirby-Bauer/antibiotic disc susceptibility test to assess the resistance pattern in the bacterial species.

Findings

Preliminary investigations showed the presence of seven multidrug-resistant bacterial species in the litter from poultry farms, with five species having a multiple antibiotic resistance index greater than 0.2. No evidence of antimicrobial resistance was found in the water and soil samples taken from the vicinity of the poultry farms. However, in agricultural fields where the poultry litter is used as manure, seven multidrug-resistant species were found, with two species scoring a resistance index greater than 0.2. Antimicrobial resistance in soil samples from the village (control site) was negligible, indicating low risk of antibiotic contamination at sub-catchments.

The study found that disinfection at the poultry farm level does not help curb the spread of antimicrobial resistance in the region. Further, the use of poultry litter as farm manure in agricultural soil leads to the spread of antimicrobial resistance in water and soil in places outlying poultry farm areas. Therefore, in addition to deploying disinfection practices at farm levels, it is important to a) limit antibiotics in the chicken feed and b) treat litter before using it as manure.

Antimicrobial resistance is carried into the environment through untreated poultry litter which is used as manure.



What can be done?

Guidelines for safe poultry waste disposal exist across state Pollution Control Boards. However, these are not enforced, meaning that they are not necessarily implemented by poultry farmers. Further, food and environmental safety audits are generally performed by poultry producer companies internally, reducing their accountability and transparency. Mandating safe waste disposal rules, and introducing third party audits for compliance can improve the conditions under which poultry is farmed, and reduce antibiotic abuse.

Farmers need to be educated about the appropriate use of antibiotics only when necessary, and to avoid low-dosage antibiotics in poultry feed and supplements. This can also be treated as an occupational safety measure. Additionally, farmers can be trained to access affordable antimicrobial testing either through handheld chromatography tests, or through local laboratories. This enables them to monitor their environmental safety, and make changes in feed sources or waste disposal as prescribed by standard operating procedure guidelines and rules.

Allied agencies can extend support in monitoring poultry inputs, products, waste, and environments. Existing programmes monitoring feed quality, food safety, and soil and water quality can be used to cross-check and certify food and environmental safety of poultry farming. Certifications and labelling will also influence consumer choice and therefore market demand for antibiotic-free poultry products, creating a positive feedback loop.



Solving the problem



Enforce environment and food safety guidelines

Make implementation and third party auditing of waste disposal guidelines mandatory for food safety

Apply standards and labelling to influence consumer education and choice of antibiotic-free poultry products

Related SDGs



Empower farmers to reduce antibiotic use

Educate poultry farmers about antibiotics, supplements, and their impacts on their environment and health

Enable affordable testing for antibiotics in poultry products and waste through kits and training



Engage related agencies in monitoring

Poultry and agriculture development boards, food safety agencies can audit poultry inputs and products for antibiotics

Pollution control boards and local governing bodies can monitor farms for environmental antibiotic resistance



How?



Enforce

Implementation and auditing for:

- Safe waste disposal through State Pollution Control Boards
- Feed quality and manure testing by Central Poultry Development Organisation

Food safety auditing and labelling through:

- Centre for Chronic Disease Control's antimicrobial resistance programme
- Food Safety and Standards Association of India and AgMark



Empower

Farmer education and training through:

- Central Poultry Development Organisation
- Centre for Chronic Disease Control's antimicrobial resistance programme



Engage

Public awareness through

- Food Safety and Standards Association of India
- AgMark
- Campaigning by brands

Environmental monitoring for antimicrobial resistance through:

- Local Departments of Water and Sanitation
- Indian Agricultural Research Institute
- Poultry producer companies