



MUJIMUN

March 25th - March 29th 2020

FAO

Study Guide

Topic A:

Illegal, unreported, unregulated fishing

Topic B:

Curbing the threat from antimicrobial resistance to animal and human health

Münster, March 2020
Münster University
International Model United Nations
(MUIMUN)
Web: www.muimun.org
E-Mail: secgen@muimun.org
c/o Arbeitsstelle Forschungstransfer
Robert-Koch-Str. 40
48149 Münster
Phone: +49 251 833 2943

Under direction of the General Secretariat
Secretary-General: Ana Maria Buttkus Ocampo
Deputy Secretary-General: Greta Lenzing

Supported by:



Westfälische Wilhelms-Universität Münster
Schlossplatz 2
48149 Münster
Web: www.uni-muenster.de
E-Mail: verwaltung@uni-muenster.de
Phone: +49 251 83 0



Münster MUN e.V.
Scharnhorststraße 12
48151 Münster
Executive management:
Maike Janssen, Maximilian Wendisch
Web: www.muenster-mun.de
E-Mail: info@muenster-mun.de



Arbeitsstelle Forschungstransfer

Arbeitsstelle Forschungstransfer
Robert-Koch-Str. 40
48149 Münster
Web: www.uni-muenster.de/AFO/
E-Mail: uvafo@uni-muenster.de
Phone: +49 251 83 32221

Content:
Jackline Birir
Hamza Naseer

Content Advisor:
Ellen Barnert

Design:
Ana Maria Buttkus Ocampo

Word of Welcome from the Chairs

Salutations everyone!

My name is Hamza Naseer, and I hail from the Islamic Republic of Pakistan. With great pleasure, I welcome everyone to MUIMUN'20. I look forward to meeting all of you, not just for the purposes of enjoying cohesive and fruitful debate, but for having great fun through the exchange of amusing life experiences as well as (I wish!) philosophical dialogue. I am a student of Psychology and Philosophy, but I love Literature and Linguistics too, and would love to have long discussions over these subjects! Side by side, I coach Model UN's at various institutions, and that keeps my tastes for good books and good food well-funded. As a chair, I expect everyone to be, first of all, committed to having a learning experience and to leave the committee room better informed (not just in our chosen topics) than when they entered it. Secondly, I expect speeches that have a firm grasp on the balance that ought to exist between rhetoric and content. Thirdly, I expect shining diplomacy skills, which means knowing when to compromise, and when to be assertive and adamant. Finally, I cherish delegates with pristine drafting skills, which means following the format and avoiding sentences that resemble our combined meaningless existences.



Greetings Delegates!

Welcome to the MUIMUN Conference 2020, FAO Committee. My name is Jackline Birir and I will be your Chair during this conference. I am a law student at the Kenyatta University in Kenya. I am very passionate about the law and interested in legal issues with regard to international and global matters. I have had the best experience with MUN. I began to participate as a delegate since 2nd year and have since enjoyed the experience that comes along with sharing and learning from different people, in different professions and with different ideas. It is the best way to gauge your understanding of national and international contemporary issues and attempt to find solutions to them.

The topic “Illegal, unreported, and unregulated fishing” closely relates with the Sustainable Development Goals. I look forward to solutions on the impacts of IUU on the environment, economy, climate as well as globally



backed up with valid laws and protocols thereto. Most importantly, I hope that at the end of the conference, you will have gained skills on public speaking, critical analysis of the issues and the methods of dispute resolution.

If there are any questions on the topic or on procedures and protocols on the conference, feel free to contact us at fa0.muimun@gmail.com. I look forward to meeting and debating with you all.

Table of Contents

Word of Welcome from the Chairs	0
Committee Overview.....	1
Mandate of FAO	2
Topic A: Illegal, unreported, unregulated fishing.....	5
<i>Introduction.....</i>	<i>5</i>
<i>International framework to combat IUU.....</i>	<i>5</i>
United Nations Convention on the Law of the Sea (1982)	5
United Nations Fish Stocks Agreement 1995.....	5
FAO Agreement to promote compliance with international Conservation and Management Measures by Fishing Vessels on the High Seas 1993.....	6
International Plan of Action to Prevent, deter and eliminate Illegal, Unreported and Unregulated Fishing (2001)	6
<i>Current Situation</i>	<i>7</i>
<i>Issues Arising and challenges.....</i>	<i>7</i>
<i>Questions a resolution should answer</i>	<i>8</i>
<i>Conference and research tips.....</i>	<i>8</i>
<i>Bibliography.....</i>	<i>9</i>
INTERNATIONAL STATUTES.....	9
JOURNALS & ARTICLES	9
CASES	9
Topic B: Curbing the threat from antimicrobial resistance to animal and human health.....	10
<i>Introduction.....</i>	<i>10</i>
<i>Context.....</i>	<i>11</i>
<i>REcent developments</i>	<i>14</i>
<i>Current challenges</i>	<i>15</i>
<i>Questions a Resolution should answer</i>	<i>16</i>
<i>Bibliography.....</i>	<i>17</i>

Committee Overview

The Food and Agriculture Organization of the United Nations (“FAO”) was born in the year 1945. In 1946, the FAO held “The Special Meeting” to discuss urgent food problems. This meeting was attended by 70 governments, and after FAO calculated that there would be a gap in the 1946-47 harvest period between demand and supply. The then Director-General of FAO proposed to the committee the task of taking serious measures to control this impending crisis through the mobilization of resources. The very first task, in fact, that FAO carried out immediately after its establishment was to ascertain the state of nutrition worldwide. The first World Food Survey was conducted in 1946, which gathered data from across 70 nations in the most scientifically precise way possible, and reliably proved that malnourishment and starvation were widespread issues.

In 1950, continuing with its mission to eradicate world-wide hunger and to counter the negative effect upon local economics from outdated practices related to forestry, fisheries, and agriculture, the FAO conducted the World Census of Agriculture where they created certain guidelines that were meant to generate figures which could be internationally compared related to the structure of agriculture. Countries were helped by this census in the sense that it was easier for them to now carry out national censuses since they could now use a standard which was international, that is, a set idea now existed about definitions, concepts, and methodologies. In 1949, a substantial move was decided upon by the member states in the fifth session of the General Conference: the offices of FAO were to be moved to Rome, and, in 1951, two ships with 76 families on board sailed from Washington.

In 1952, the Second World Food Survey was conducted: the results included the finding that the gap between countries that were well-fed and those that were worse-fed had widened. It also found that the supply of average calories per person had fallen massively, to the extent that the supply was below the pre-war level. Arguably, 1952 is the year when FAO kickstarted into action and started a series of projects that are impactful and working even today:

- International Plant Protection Convention (to protect the plant resources of the globe from pests).
- World Seed Campaign (aimed at seed improvement and distribution).
- UN Special Fund (FAO is responsible in 1958 for almost one-third of the activities of the Special Fund).
- The World Food Programme (aimed at providing food urgently to affected areas).
- The Third World Food Survey (which finds that 10 to 15 percent of the global population is undernourished and half suffer from hunger, or malnutrition, or both).

- World Food Conference (A world food bank is to be established with 10 million tonnes of stored grain, an International Fund for Agricultural Development is to be founded, and a flood forecasting system is to be set up to predict upcoming future crises).
- World Conference on Fisheries (highest number of delegates attend the conference, long term goals are agreed upon for fisheries).
- Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (EMPRES) is set up in 1995 to fight diseases affecting animals and plants as well as those diseases that are transboundary.
- The Code of Conduct for Responsible Fisheries is also set up to ensure sustainable use of fisheries and address aquaculture development.
- In 2001 the International Treaty on Plant Genetic Resources for Food and Agriculture is set up, which is legally binding, to encourage sustainable agriculture via sharing of genetic information amid farmers, breeders, and institutions dedicated to research in an equitable manner.
- Emergency Relief for Pakistan in 2010: floods have wiped out livestock and seeds in the heavily agriculture-oriented country and FAO distributes wheat seeds to half a million families that are dependent on farming for the oncoming planting season; 235 000 families also receive aid for their livestock in the form of feed and medicine.
- In 2014, Principles for Responsible Investment in Agriculture and Food Systems are set up--they are meant to encourage responsible investment for better security of food and nutrition. In 2016, the FAO adopts the SDG's, under the 2030 Agenda for Sustainable Development to shape all their plans for the next 15 years...food and agriculture is of utmost priority in the 2030 Agenda.

Mandate of FAO¹²

The FAO is a specialized agency of the United Nations. With 191 member nations, 1 Member organization (European Union) and 2 Associate Members (Farou Islands and Tokelau), it has a unique structure of governance. Firstly, The FAO Conference: it is the highest governing body under the FAO, and meets every two years in Rome. Its primary role is to approve the budget and program of work that is adopted by the FAO as well as to decide upon the policies of the Organization.

Secondly, the FAO Council: the Conference appoints the Council, which has 49 members, each of which serves three-year terms; it reviews important matters during regular sessions and is meant to meet four times before each session of the FAO Conference.

¹<https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/documents/files/FAO.pdf>

²<http://www.fao.org/3/x5584e/x5584e0i.htm>

Thirdly, the FAO Regional Conferences: they can be convened at any time during the years between Conference sessions by Member Governments according to each major geographic region.

Finally, there are FAO committees: they are established by the FAO constitution to help the Conference and Council members in making decisions that are particular to policies that require technical information.

The FAO conference, in line with the FAO constitution, is meant to meet at least once every year. Each member nation only has one vote; however, advisers and associates or an alternate may participate, for whom the Conference may make rules but they shall not all have the right to vote until and unless an alternate or advisor is acting in the place of a member. Representatives from public international organizations whose work is relevant and/or deemed important by the Conference may be allowed, but they shall not be granted a right to vote. Unless otherwise specified, all matters are decided by the Conference by a simple majority of the votes cast.

In relation to voting and elections in the Conference and Council, these rules shall be followed:

- A majority of Member Nations in the Conference, and a majority of Members in the Council, shall constitute a quorum.
- Before every voting or election, the Chairperson is obligated to announce the number of representatives/delegates present. If it falls below the required number for a quorum, the vote or election cannot be held.
- The required majority, unless specified otherwise, in an election or vote, will be more than one-half of the votes cast.
- When a two-thirds majority of votes cast is required by the Conference as specified by the Constitution, then the total number of affirmative or negative votes cast must be more than one half of the Organization's Member Nations.
- Voting can be done in the form of a show of hands, roll call, or secret ballot.

Below follow the decisions, which when to be taken by the Conference, require a two-thirds majority, provided the total number of negative and affirmative votes cast is more than one half of the Organization's Member Nations:

- The admission of Associate or additional members.
- Approvals that are relevant to agreements and conventions.
- Approval between Organizations and Member Governments with respect to Agreements.
- Decisions related to the setting of the budget.
- Recommendations to Member Governments in view of their formulation.
- Incorporating new items on the agenda of the Conference they are formally adopted.

- Amending or suspending the General Rules of the Organization.

In case the Conference intends to introduce amendments to the Constitution, for that to happen a two-thirds majority of votes cast is necessary, keeping in mind that the majority of votes cast is more than one-half of the member nations. A two-thirds majority from the membership of the Council is also required (which means at least 33 Council Members in affirmative) when it comes to approving agreements as well as supplementary conventions; this includes also the addition of items to the agenda of the Council during a session.

Topic A: Illegal, unreported, unregulated fishing

INTRODUCTION

Illegal, unreported, unregulated fishing (IUU) occurs at the international, regional and national sectors therefore requires attention in order to manage and regulate these activities. It is concerned with all levels of fishing-related activities from conservation to crimes that arise from illegal, unregulated and unreported fishing. Products and resources acquired from IUU may find its way into the local markets of various states thus leading to the collapse of various economic zones and inflation of prices in various states.³ This in turn may lead to but not limited to poverty, food insecurity, unsustainability of the fisheries sector and livelihood of people.

Illegal, unreported and unregulated fishing is generally referred to as IUU. It is a broad term which includes:⁴

- a) fishing activities that are contrary to the national, regional and international legislations
- b) lack of or inadequate reporting of fishing-related activities and
- c) Fishing activities that have not been regulated or restricted by any laws.

INTERNATIONAL FRAMEWORK TO COMBAT IUU

There are a variety of instruments that develop the regulation of IUU:

United Nations Convention on the Law of the Sea (1982)

UNCLOS has been the general law that governs all the activities in the High Seas and all water bodies. It provides for the rights and duties of various states with regard to IUU. It also gives a list of measures to be taken in sustainable exploitation and exploration of marine resources.⁵ UNCLOS further provides for the bodies and Authorities that aid in the settlement of disputes relating to the marine environment.⁶

United Nations Fish Stocks Agreement 1995

This instrument has the main objective of ensuring sustainable conservation and use of fish stocks. It further provides for the duties and rights of flag states with regard to fishing-related activities. Thus establishes liability on which state is responsible for IUU.⁷ The Agreement also provides and encourages international

³ <http://www.fao.org/3/a-i6069e.pdf> (accessed on 29th February 2020)

⁴ <http://www.fao.org/3/a-i6069e.pdf> (accessed on 29th February 2020)

⁵ Article 118 of the United Nations Convention on the Law of the Sea 1982

⁶ Article 156 of the United Nations Convention on the Law of the Sea 1982 that establishes The Authority.

⁷ <https://sustainabledevelopment.un.org/topics/oceans/unfishstock> (accessed 29th February 2020)

co-operation within states to prevent and manage IUU by ensuring the preservation of rare fish and monitoring migratory habits of the marine animals.

FAO Agreement to promote compliance with international Conservation and Management Measures by Fishing Vessels on the High Seas 1993

This Agreement states the various responsibilities and obligations on states in ensuring sustainable exploitation of marine resources, trade of fish and other fishing related activities.⁸ Article 2 of the Agreement provides for the various objectives one of which is the establishment of principles for responsible fishing, fisheries management and development and promotion of co-operation of states in marine management and conservation.⁹

International Plan of Action to Prevent, deter and eliminate Illegal, Unreported and Unregulated Fishing (2001)

Commonly referred to as IPOA-IUU. It is the most relevant toolbox in the fight and regulation of IUU among states. It gives duties and responsibilities to flag states¹⁰, and coastal states relating to the regulation of IUU and the establishment of measures towards combating the same. This Action Plan has also developed a state-reporting mechanism in which states review and discuss.¹¹

The high seas have been defined under Article 86 of the UNCLOS as an area of the sea that does not include the Exclusive Economic Zone, the Territorial sea and the internal waters.¹² Therefore, “all states have the rights to fish in the High Seas.”¹³ Article 90-95 further provides for the rights and duties of flag states. A flag state is one which sails its ships with the flag of a specific state as per Article 90 of the UNCLOS.

Conversely, Article 119 of UNCLOS provides the necessity of regulation of IUU fishing. That is, to ensure sustainable management of fishing in order to prevent exploitation of marine resources. Moreover, it encourages states to research and analyze fishing patterns so as to avoid over exploitations of specific fishing stocks.¹⁴

It is therefore important for these instruments to be implemented at the international, regional and national levels in order to ensure sustainable management of marine environment by securing fishing activities in order to avoid food insecurity and crimes.

⁸ <http://www.fao.org/3/a-v9878e.pdf> (accessed 29th February 2020)

⁹ Articles 2(a), (b) and (e) of the FAO Agreement to promote compliance with international Conservation and Management Measures by Fishing Vessels on the High Seas 1993

¹⁰ See definition in Article 90 UNCLOS; See Enforcement by flag states in Article 217 UNCLOS; https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf

¹¹ <http://www.fao.org/3/a-y1224e.pdf> (accessed on 29th February 2020)

¹² https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf (accessed on 2nd March 2020)

¹³ Article 116 of the UNCLOS

¹⁴ Article 119 (1)(a) of UNLCOS

CURRENT SITUATION

The most recent milestone in the combat of IUU is the **Port State Measures Agreement** which is the first ever international agreement that targets the fight against IUU fishing. It developed the various rules that are adhered to by Port states which ensure that any fishing vessel that docks at their ports have complied with their conditions and regulations regarding fishing activities.¹⁵ Ports have been defined under Article 1 of this instrument as “offshore terminals and other installations for landing, transshipping, packaging, processing, refueling or resupplying.”¹⁶

It was the first instrument to comprehensively define fishing and fishing activities.¹⁷ The Agreement provides for key measures to be undertaken by the various party states, such as:

- vessels of foreign states need to seek for permission from the port states prior entering their ports
- inspection shall be carried out by the port state on any vessel regarding its papers and the catches made and
- port states have the right to deny a foreign vessel entry into its port if after inspection, it was found to have engaged in IUU Fishing.

Another paramount step was taken by FAO in its Programme known as “Support for the Implementation of the 2009 FAO Agreement on Port State Measures and Complimentary instruments to combat illegal, unreported and unregulated fishing.”¹⁸ It is a **5 year Programme** that intends to combat IUU Fishing by ensuring the implementation of policies and laws in various states.

ISSUES ARISING AND CHALLENGES

United Nations on Drugs and Crime has identified the fisheries industry as one of the sectors in which fishing vessels have been associated with International Organized Crimes¹⁹ such as trafficking²⁰ and Piracy. Piracy has been defined in Article 100 of UNCLOS. Most of these crimes are committed alongside IUU fishing. IUU Fishing has generally been considered as an environmental crime that leads to the depletion of the ecosystem.

¹⁵ http://www.fao.org/fileadmin/user_upload/legal/docs/037t-e.pdf (accessed on 29th February 2020)

¹⁶ Article 1 of the Agreement on Port State Measures to prevent, deter and eliminate Illegal, Unreported and Unregulated Fishing

¹⁷ Article 1: Fishing “means searching for, attracting, locating, catching, taking or harvesting fish” whereas fishing related activities means “any operation in support of, in preparation for fishing including landing, packaging, processing and transporting of fish that have not been previously landed at the port. . .”

¹⁸ <http://www.fao.org/3/a-i6069e.pdf> (accessed on 29th February 2020)

¹⁹ UNODC (2011). Transnational organized crime in the fishing industry [WWW]. Available from: <https://www.unodc.org/unodc/en/human-trafficking/2011/issue-paper-transnational-organized-crime-in-the-fishing-industry.html> (accessed on 29th February 2020)

²⁰ Article 108 of UNCLOS prohibits illicit traffic of narcotic drugs that occur in the High Seas which encourages IUU fishing.

The European Union is the world's largest import market for fisheries products hence bears the primary responsibility in the fight against IUU fishing. States are issued with yellow, green or red cards. A yellow card is issued by the commission once it is satisfied that the state does not co-operate in the elimination of IUU fishing.

Where the state fails to co-operate after the issuance of the yellow card, the Commission issues a red card. Such a country is then added to the list of non-cooperating states.²¹ Once the country shows initiatives to end IUU Fishing, it shall be delisted and issued a green card. This system has proven effective in stopping states that conduct IUU fishing from accessing the market thus creates liability.²²

The effects of IUU fishing have also been felt economically and politically. This is especially due to the effect the flag state and its liability in the event it is caught conducting illegal and unregulated fishing in the High seas. IUU Fishing is the most serious threat to sustainable exploitation of living aquatic resources hence the need for regulation.

QUESTIONS A RESOLUTION SHOULD ANSWER

- What are some of the effects of IUU fishing on biological and economic factors?
- Have the Vessel Monitoring Systems have led to the reduction of IUU fishing
- Is there a need to call for increased cooperation between flag states in their conduct of monitoring, control and surveillance operations in order to eliminate IUU fishing?
- What are the effects of technological development on IUU fishing?
- What are some of the recommendations on legal and institutional frameworks to govern states that practice IUU fishing?

CONFERENCE AND RESEARCH TIPS

The following materials are necessary for the comprehensive understanding and research of the topic at hand. They will assist you in the research on the points of discussion of the topic, and in the attainment of exhaustive research and therefore promising an interesting debate:

1. United Nations Convention on the Law of the Sea
2. United Nations Fish Stocks Agreement

²¹Blomeyer & Sanz, "Illegal, Unreported and Unregulated Fishing: Sanctions in the EU," 2014 [https://www.europarl.europa.eu/RegData/etudes/STUD/2014/529069/IPOL_STU\(2014\)529069_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2014/529069/IPOL_STU(2014)529069_EN.pdf) (accessed on 29th February 2020)

²²Blomeyer & Sanz, "Illegal, Unreported and Unregulated Fishing: Sanctions in the EU," 2014 [https://www.europarl.europa.eu/RegData/etudes/STUD/2014/529069/IPOL_STU\(2014\)529069_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2014/529069/IPOL_STU(2014)529069_EN.pdf) (accessed on 29th February 2020)

3. The Compliance Agreement/ FAO Code of Conduct
4. Forum Fisheries Agency guidelines

These research materials will shed light on the recommendations and solutions for a good and practical resolution paper.

BIBLIOGRAPHY

INTERNATIONAL STATUTES

- United Nations Convention on the Law of the Sea (1982) <http://www.fao.org/3/a-i6069e.pdf>
- FAO Agreement to promote compliance with international Conservation and Management Measures by Fishing Vessels on the High Seas 1993 <http://www.fao.org/3/a-v9878e.pdf>
- United Nations Fish Stocks Agreement 1995
- International Plan of Action to Prevent, deter and eliminate Illegal, Unreported and Unregulated Fishing (2001) <http://www.fao.org/3/a-y1224e.pdf>

JOURNALS & ARTICLES

- UNODC (2011). Transnational organized crime in the fishing industry [WWW]. Available from: <https://www.unodc.org/unodc/en/human-trafficking/2011/issue-paper-transnational-organized-crime-in-the-fishing-industry.html>
- Blomeyer & Sanz, “Illegal, Unreported and Unregulated Fishing: Sanctions in the EU,” 2014 [https://www.europarl.europa.eu/RegData/etudes/STUD/2014/529069/IPOL_STU\(2014\)529069_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2014/529069/IPOL_STU(2014)529069_EN.pdf)
- “FAO Illegal, Unreported and Unregulated Fishing”, <http://www.fao.org/3/a-i6069e.pdf>
- “How to end Illegal Fishing: The Role of the Flag State.” <https://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2019/08/how-to-end-illegal-fishing-the-role-of-the-flag-state>
- Rothwell, D., & Stephens, T. (2004). Illegal Southern Ocean Fishing and Prompt Release: Balancing Coastal and Flag State Rights and Interests. *The International and Comparative Law Quarterly*, 53(1), 171-187. Retrieved February 29, 2020, from www.jstor.org/stable/3663140

CASES

- The International Tribunal for the Law of the Sea Advisory Opinion on Flag State Responsibility for Illegal Fishing in the Exclusive Economic Zone (2013) <https://doi.org/10.1080/00908320.2016.1229939>

Topic B: Curbing the threat from antimicrobial resistance to animal and human health

INTRODUCTION

Antimicrobial resistance has become an increasingly challenging problem over time; the way it manifests itself is that different diseases evolve to become resistant to medications that exist to counter them. One prime example of this is Tuberculosis which now can manifest itself in the form of drug-resistant tuberculosis (DR-TB) as well as multidrug-resistant tuberculosis (MDR-TB). MDR-TB alone claimed 120,000 lives (estimated) in 2012 alone.²³

The problem, in fact, is so severe that the World Health Organization states “a post-antibiotic era” is a very likely scenario for the 21st century.²⁴

The predominant expectations from FAO is to look into the development of the problem from its roots-it is well known that the existence of antimicrobial resistance developed from the misuse and overuse of antibiotics, and what this eventually can lead to is a time where easily preventable diseases, such as throat infections, lead to an inevitable death.²⁵

Apart from the misuse and overuse of antibiotics on humans, there is another pertinent problem: the utilization of antibiotics on animals. In the USA, 70% of antibiotics that are medically important all go to animals that are used for livestock rearing. More pressing is the concern that actually all the data we receive might not be as accurate as is needed: while it is true that under the Animal Drug User Fee Act (ADUFA)²⁶, sponsors of antimicrobial drugs need to report to the FDA the annual amount of antibiotics they sell to be used in animals meant for human consumption, the FDA also feels it is inaccurate primarily because not all of the purchased antibiotics are used. So, the formation of a clear picture on the antimicrobial resistance and its effects becomes difficult to draw. The National Resources Defense Council, Inc. (NRDC; a non-profit organization) feels that the FDA ought to simply withdraw the authorization of using medically important antibiotics to counter disease prevention for rearing of livestock and poultry.²⁷ This is primarily because of the fact that they might feel the parties involved in livestock rearing use “disease prevention” as an excuse to pump animals full of antibiotics since that serves as a hasty, cheaper alternative to the health problems animals face by virtue of being tightly packed together. Otherwise, animals would need to be given a better lifestyle in terms of investments in more land for them to roam in, and since parties involved in livestock

²³ WHO. (2014), p. 65.

²⁴ WHO. (2014), p. IX.

²⁵ FAO. (2019), p. 1.

²⁶ <https://www.fda.gov/industry/fda-user-fee-programs/animal-drug-user-fee-act-adufa>

²⁷ <http://www.cidrap.umn.edu/news-perspective/2016/12/fda-antibiotic-use-food-animals-continues-rise>

farming have a profit-based incentive, the likelihood of that change is unlikely. This brings us to another important problem in particular to our topic of antimicrobial resistance as it relates to livestock rearing: the problem of land allocated to animals.

CONTEXT

The number of animals we consume for eating have been rising: “In 2016, the cattle population reached 1,474 million animals, up 44% from 1966. The number of chickens grown for human consumption increased from 4.4 billion to 22.7 billion between 1966 and 2016. During the same period, the pig population grew by 92% to reach 981 million heads.”²⁸ As the number of animals rises, then lands need to be made available for these animals. Currently, 71% of our land is considered habitable-and half of that is used for agriculture. From that half, 77% is used for livestock rearing.²⁹ This comes at a great cost to our environment: to clear up land for livestock rearing, habitats are destroyed, rainforests cleared away, and these in turn lead to harm for the air and water through massive pollution. But there is a limit to the amount of land that can be made available for animals: which is why they are stuck in one area altogether their entire lives, in a mess of their own feces. This naturally creates the possibility of disease: all that is curbed by the overuse of antibiotics. And that in turn creates meat full of antibiotics. This meat, when consumed, leads to antibiotics entering humans.

What delegates of FAO are expected to analyze is the effect this has on humans: “zoonoses” is the name of those diseases that spread from animals to humans; these include salmonella, for example, and the organisms that cause these diseases, such as the enterococci, may not be harmful for animals but are definitely harmful for humans-but the epidemiology of these diseases is still hard to determine since sources of transmissions other than animals also exist. A fear that ought to be entertained is the fact that if antibiotic resistant bacteria end up in the human body, countering the disease such a bacteria causes would be hard to tackle-however, delegates are instructed to pay attention to research, for studies suggest that the chances of a disease proving fatal might have little do with the bacteria being resistant to bacteria or not.³⁰ Piddock³¹ asserts ‘clear evidence that antibiotic-resistant bacteria from animals caused human infections which were difficult to treat, is extremely difficult to find’ and that ‘it is not widely accepted that quinolone-resistant strains (of *Salmonella Typhimurium* DT104) are transmitted through the food chain’. Another reason why it is hard to determine the epidemiology of these diseases is because of the fact that as of yet there are only 42 countries in the world with a system meant to collect data on the use of antimicrobials in livestock.³² Other

²⁸ <https://www.globalagriculture.org/report-topics/meat-and-animal-feed.html>

²⁹ <https://www.onegreenplanet.org/news/chart-shows-worlds-land-used/>

³⁰ <https://academic.oup.com/jac/article/53/1/28/680882#11936538>

³¹ Piddock, L. J. V. (2002). Fluoroquinolone resistance in *Salmonella* serovars isolated from humans and food animals. *FEMS Microbiology Reviews* 26, 3–16.

³² <http://www.fao.org/antimicrobial-resistance/key-sectors/animal-production/en/>

sources of contamination of this meat include but are not limited to: contamination by food handlers, from pets, from salmonellae which persist in biofilms of domestic toilets of those suffering from gastroenteritis, and more. Contamination also occurs from animal waste in soil and water, as 75% to 90% of antimicrobials are excreted by the livestock they were used on in an unmetabolized form.³³ Another tangent to this is the simple fact that when animals are living in close quarters, and a few get sick, a ready solution in the eyes of most farmers is this: to treat ALL animals with the antibiotic to prevent its spread. Problems have also arisen because of the use of antimicrobials to boost the growth of animals. It is widely believed that the use of antimicrobials in livestock will double in the next 20 years. The same is true for aquaculture: the excessive use of antimicrobials WILL not only contaminate our environment but also push a rise of resistant microorganisms. Their misuse also contributes to them becoming less effective as medicine for both humans and animals and AMR can also emerge in an evolved form within disease-causing microorganisms.³⁴ How are resistant microorganisms formed? A good example is genetic mutation.³⁵ Genetic mutation when it comes to bacteria manifests itself interestingly: since bacteria multiply via division, with one cell splitting into two identical ones, each bacterium, before splitting, needs to create two identical copies of the DNA that is in its chromosome. When this process occurs, there is always the slight risk of mutations--they are random in their nature and can be found anywhere upon the DNA. Harmful chemicals as well as radiation can cause these mutations.³⁶ These mutations can be good for the survival of the bacteria, which lines up with Darwin's theory of natural selection: adapting yourself for the environment in order to increase your chances of survival and multiplication--however, it comes at a great cost: the survival of certain bacteria is obviously not good for the human race. What are the different ways that gene mutation manifests itself physically within bacteria?

The first thing that happens is that the antibiotic is prevented from being able to reach its target. This is done in several ways: a. bacteria have pumps in its cell wall or membrane. These pumps can take out material inside the cell, like nutrients. Similarly, they can take out antibiotics from within the bacteria and lower the concentration of antibiotics within the cell itself. Another thing that can happen is that the membrane's permeability can be decreased -this way less of the antibiotic gets into the bacteria. Along with that, there are cases of antibiotics being destroyed or being made inactive via enzymes bacteria releases - similarly, bacteria also are capable of producing enzymes that modify the antibiotic itself, making it difficult for the binding between the target in the bacteria and the antibiotic to occur.³⁷ The effect of AMR can be disastrous:

³³ <http://www.fao.org/antimicrobial-resistance/key-sectors/animal-production/en/>

³⁴ <http://www.fao.org/antimicrobial-resistance/key-sectors/animal-health/en/>

³⁵ APUA. (2015), p. 1.

³⁶ ReAct. (2018), p. 1.

³⁷ ReAct. (2015), p. 1.

treatments become ineffective, diseases are more severe, losses of an economic nature are higher, and productivity in general is massively reduced.³⁸

Delegates are also expected to analyze, apart from the contribution of livestock rearing to antimicrobial resistance, the changes that are coming within the industry-there is now a transition in the industry where plant-based synthetic meat is being created instead of meat from slaughtered animals.. What is the purpose of this? To counter the harm that livestock rearing poses to us, but to do it by creating a type of meat which looks, tastes, and smells, just like normal meat. However, this comes with its own problems. Firstly, plants are not immune to also being affected by antibiotics and contributing to antimicrobial resistance in humans; bacteria, after all, also affect plants, and they have to be curbed by antibiotics-this in turn leads to antibiotics our diet via plants as well, whether taken as they are, or used for creating synthetic meat.

Apart from the factor that plants also use antibiotics, there is a ground reality: few people are interested in consuming fake meat. However, companies like *Impossible Foods Inc.* are trying to change that: in 2015 they discovered a way of synthesizing heme Iron in a lab. Heme Iron is found in animals, and gives meat that juiciness most meat-lovers crave. Effectively, they created fake meat based on plants that does smell, taste, and bleed, just like real meat.³⁹ But apart from people's "ick" factor to synthetically produced meat, there is also the problem of cost: Mosa Meat's "Chief Scientific Officer," Prof. Mark Post unveiled what was at the time the world's first slaughter-free burger in 2013. It was made from cow cells as opposed to the rearing and slaughtering of an entire animal. It cost €250,000 to make.⁴⁰ They claim to have made scientific breakthroughs that brought the price of their meat down, but still, cost remains a question: how many people would be willing to invest that much into a simple burger when the same thing, possibly better tasting, is more readily available at a much lower price in every McDonald's and KFC?

Finally, it is also worth noting that the way KFC and in general other companies that rely on slaughtered animal meat work is that they distance the consumer from the origins of their product: they do this via the utilization of language. The language they use is meant to camouflage the actual source of the meat, so the natural disgust factor in people when they think, "I am about to consume flesh that came from the slaughtering of a healthy goat" is taken away from them: how? "Cow" is replaced with the word "beef." "Pig" is replaced with the word "pork." Perhaps that is what companies producing synthetic meat ought to do as well-follow a model where the words like "test-tube", or "lab-produced", are replaced with something better and more appealing. In fact, these companies have attempted to do so: trying to use words like "cultured" or "cell-based." But they have been prevented from doing so: Missouri became the first state in the US in 2018 where they banned the sale of any food product under the name of "meat" until and unless it came from a slaughtered animal. The violation of this could result in a year in prison. The EU also proposed in the year

³⁸ <http://www.fao.org/antimicrobial-resistance/key-sectors/animal-production/en/>

³⁹ <https://impossiblefoods.com/company/overview/>

⁴⁰ <https://www.mosameat.com/our-story>

of 2018 to ban companies that were selling meat alternatives from using words like “steak” or “sausage.”⁴¹ Either way, if this is allowed, then the delegates of FAO are encouraged to think about the ethics of such a freedom: are consumers being lied to? Are they being deceived? Or is it simply for their betterment, and if so, should this continue? Should companies have the liberty to advertise their products like this under a free market economy?

When it comes to plant production, agrochemicals are also used-the potentiality of AMR in that sector is low, but should not be ignored. As the FAO observes, “the residues of fungicides and antibiotics in crops may encourage emergence of resistant strains of fungus and bacteria and possibly increase the risk of human resistance to the drugs.”⁴²

Delegates of the FAO are expected to analyze how the use of antibiotics in the food production industry pose a threat to human health, and they should address this problem by issuing the pertinent solutions to avoid an indiscriminate use of antibiotics in the food production chain.

RECENT DEVELOPMENTS

What has the international community done and have any treaties been passed to curb the issue?

An important example of something being done effectively to curb the threat of antimicrobial resistance is the U.S. National Action Plan for Combating Antibiotic-Resistant Bacteria. Developed by the Interagency Task Force for Combating Antibiotic-Resistant Bacteria, the National Action Plan aims to implement the U.S. National Strategy for Combating Antibiotic-Resistant Bacteria. It directs federal agencies to push for improvements against these threats. It follows a five-year plan to ensure that antibiotic resistance is reduced via innovation within prevention strategies, surveillance enhancement, and the adoption of strategies that are evidence-based.⁴³ However, this is a local body that functions within the US. On a much more global scale, in May 2015, the World Health Organization, at the 68th World Health Assembly, endorsed an action plan that was global in its scope to tackle antimicrobial resistance. It had five strategic objectives:

- to improve awareness and understanding of antimicrobial resistance;
- to strengthen knowledge through surveillance and research;
- to reduce the incidence of infection;
- to optimize the use of antimicrobial agents; and

⁴¹ Netflix Series, ‘Explained.’ Season 2 Episode 3: The Future of Meat.

⁴² <http://www.fao.org/antimicrobial-resistance/key-sectors/plant-production/en/>

⁴³ CDC. (2015), p. 1.

- develop the economic case for sustainable investment that takes account of the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines and other interventions.⁴⁴

On 9-10 November 2017, over one hundred representatives of countries, as well as experts, linked to the Food and Agriculture Organization, the World Organization for Animal Health, and World Health Organization, met to discuss a “Global Framework for Development and Stewardship to Combat Antimicrobial Resistance.” It aimed to encourage research and make it easier to have the development of medicines that are new and affordable. It also aimed to encourage the testing of vaccines and tools. Finally, it also intended to promote access to the existing antimicrobials in an affordable manner and adopt a strategy that would control the prescription and use of these antimicrobials to counter their misuse.⁴⁵

Formal documents to ensure that all these intentions, initiatives, and proposed strategies come into being were made, most notably, WHA68.7. It tackled the problem of antimicrobial resistance from several perspectives--it encouraged cooperation within several working bodies, and added more functions to be fulfilled by these bodies in order to improve efficacy. Some fundamental assertions included: monitoring of the resource flows, working with the Strategic and Technological Advisory Group on antimicrobial resistance, planning a report for the sixty-ninth World Health Assembly, creating the best strategies with a particular focus on developing nations, give assistance to nations with low or middle incomes, ensure resources for the Secretariat keeping in mind the Programme budget 2016-17 and the Twelfth General Programme of Work 2014-19 so they can work towards implementation of the global action plan against antimicrobial resistance, and finally, to submit biennial reports to the upcoming World Health Assemblies as well as the making of an interim report to be submitted to the sixty-ninth World Health Assembly.

CURRENT CHALLENGES

The biggest challenge as it appears to be is with regards to ensuring that all new strategies developed against antimicrobial resistance are accessible and affordable, with particular focus on developing nations. This seems incredibly important today when one observes the state of the United States: with the health care system of a nature where life-saving medicine is beyond the affordability of many individuals.⁴⁶

Other challenges are almost equally pressing. There is a lack of understanding amidst the general public that there needs to be a shift towards lesser use of antimicrobials, and we need to start implementing practices in agriculture that are sustainable and have prevention of infection in animals as well as crops as a top priority. This means more awareness needs to be created as well as making it easier to have access to necessary resources so they do not need to resort to usage of antimicrobials in animals and agriculture. There needs to

⁴⁴ WHO. (2015), p. VII

⁴⁵ WHO. (2017), pp. 4-18.

⁴⁶ Khazan, O. (2018), p. 1.

be a promotion of the idea that antimicrobials are only to be used when absolutely necessary. In particular to animal health, the misuse of antimicrobials so excessively on local and global scales needs to be curbed and the idea of them being used only as necessary medicine needs to be pushed. Animal feeding is also important to address: we need alternatives to antibiotics which promote growth and increase production yield. However, the need for them could be reduced altogether if we fight another real challenge: the lack of hygiene and biosecurity measures on farms. Disease control techniques need to be popularized, stock density and stress need to be reduced, and the transport environment of these reared animals also needs to be made much better in terms of its general conditions such as neatness and openness of space.

There is also a lack of proper protocol that would oversee the use of antimicrobials. Not all countries have regulations which are strictly enforced, as a result of which antimicrobial products that are either falsified or poor can be used...or, for certain diseases, the wrong kind of antimicrobial products are used--this results in the process of antimicrobial resistance being speeded up. In many cases, prescriptions are not needed either, which is why people who are not experts end up using antimicrobials and because of lack of training, exacerbate the problem of antimicrobial resistance.

Due to the lack of proper treatment of waste material that is improperly disposed coming from production related to agriculture, manufacture of pharmaceutical products, and human sewage, antimicrobial residue and antimicrobial-resistant (AMR) organisms can be spread through the environment via waterways and in the soil.

In many parts of the world, there is still a massive gap when it comes to knowledge about antimicrobial use and its resistance. There is still a lack of investment in research and surveillance on a global scale that could potentially measure our progress towards mitigation of antimicrobial resistance.

Finally, we assume that it is only the agricultural world that needs to reform its habits which have led to AMR. That is not the case. Many of our human behaviors needed to be changed as well in order to effectively curb AMR, such as our self-prescription of medicine, our failure to complete antibiotic courses, and so on.⁴⁷

QUESTIONS A RESOLUTION SHOULD ANSWER

- What are the failures of previous existing legislation related to curbing the threat of AMR and how can they be overcome?
- What is the best way to encourage people to change their behavior with regard to AMR especially in relevance to consumer behavior e.g. shifting to meat alternatives?

⁴⁷ FAO. (2017), p. 1.

- What steps can be taken to ensure that the global community acts promptly to the threat of AMR and that local governments are able to work together?
- How can more funding be acquired for the projects that are ongoing and yet to be launched under the ambit of FAO?
- How can more innovations in the development and research of AMR be encouraged?
- How can improvements be made in areas where there is a lack of regulation with regards to antimicrobial use and a strong backlash is faced when treatment of waste material is suggested due to the expenses incurred?
- How can a more effective exchange of information between nations involved in research of AMR be achieved?
- What particular organizations exist, apart from UN-backed ones, working on AMR, and how can they be helped or promoted?

BIBLIOGRAPHY

- APUA. (2015). About antibiotic resistance. Available at: https://web.archive.org/web/20151023035356/http://www.tufts.edu/med/apua/about_issue/about_antibiotics.shtml.
- Brooks, N. (2018). Chart Shows What the World's Land Is Used For ... and It Explains Exactly Why So Many People Are Going Hungry. Available at: <https://www.onegreenplanet.org/news/chart-shows-worlds-land-used/>
- CDC. (2015). U.S. National Action Plan for Combating Antibiotic-Resistant Bacteria. Available at: <https://www.cdc.gov/drugresistance/us-activities/national-action-plan.html>.
- CIDRAP. (2016). FDA: Antibiotic use in food animals continues to rise. Available at: <http://www.cidrap.umn.edu/news-perspective/2016/12/fda-antibiotic-use-food-animals-continues-rise>
- Cronan, K. The danger of antibiotic overuse. Available at: <https://kidshealth.org/en/parents/antibiotic-overuse.html> [Accessed 19 December 2019].
- FAO. (2017). Antimicrobial resistance – what you need to know. Available at: http://www.fao.org/fao-stories/article/en/c/1056781/?utm_source=twitter&utm_medium=social%20media&utm_campaign=faoanimalhealth. [Accessed 19 December 2019]
- FAO. (2019). FAO taking a bottom-up approach to understanding antimicrobial use. Available at: <http://www.fao.org/antimicrobial-resistance/news-and-events/news/news-details/en/c/1252384/>.

- FAO. Animal Production. Available at: <http://www.fao.org/antimicrobial-resistance/key-sectors/animal-production/en/>
- FAO. Animal Health. Available at: <http://www.fao.org/antimicrobial-resistance/key-sectors/animal-health/en/>
- FAO. Plant Production. Available at: <http://www.fao.org/antimicrobial-resistance/key-sectors/plant-production/en/>
- FDA. (2020). Animal Drug User Fee Act (ADUFA). Available at:
- <https://www.fda.gov/industry/fda-user-fee-programs/animal-drug-user-fee-act-adufa>
- Global Agriculture. Meat and Animal Feed. Available at:
- <https://www.globalagriculture.org/report-topics/meat-and-animal-feed.html>
- Impossible Foods. (2020). Company Overview. Available at: <https://impossiblefoods.com/company/overview/>
- Journal of Antimicrobial Chemotherapy. (2004). *Does the use of antibiotics in food animals pose a risk to human health? A critical review of published data.* Volume 53. Issue 1. pp. 28–52. Available at: <https://doi.org/10.1093/jac/dkg483>
- Khazan, O. (2018). The 3 Reasons The U.S. Health-care System Is The Worst. The Atlantic. Available at: <https://www.theatlantic.com/health/archive/2018/06/the-3-reasons-the-us-healthcare-system-is-the-worst/563519/>.
- Mosa Meat. (2020). Our Story. Available at: <https://www.mosameat.com/our-story>
- Netflix Series, ‘Explained.’ (2019). Season 2 Episode 3: The Future of Meat.
- Piddock, L. J. V. (2002). Fluoroquinolone resistance in *Salmonella* serovars isolated from humans and food animals. *FEMS Microbiology Reviews* 26, 3–16.
- ReAct. (2015). Resistance mechanisms. Available at: <https://www.reactgroup.org/toolbox/understand/antibiotic-resistance/resistance-mechanisms-in-bacteria/>.
- ReAct. (2018). Mutations and selection. Available at: https://web.archive.org/web/20151023035356/http://www.tufts.edu/med/apua/about_issue/about_antibioticres.shtml.
- WHO. (2014). Antimicrobial Resistance: Global Report on Surveillance, p. 65.
- WHO. (2015). Global Action Plan on Antimicrobial Resistance, p. VII.
- WHO. (2017). Global Framework for Development & Stewardship to Combat Antimicrobial Resistance, pp. 4-18.