

Contemporary Jurisprudential Issues Related to Agriculture and Their Impact: A Jurisprudential Study

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Abstract: The purpose of this research is to make Sharia pronouncements regarding agricultural developments that issues from the technological and information revolution of the modern era comprehensible. It tackles concepts of up to date problems in agriculture, applications of genetic engineering, the jurisprudential clarification of recent contracts in agriculture investment, decisions on zakat in view of the modern prices, and the responsibility of the environment. The method used in the research was descriptive, analytical, and comparative, and obtained the conclusion that Islamic Sharia is able to frame this development in order to realize the interests of humans and not conflict with the principles of the religion that already exists today.

Keywords: Jurisprudence / Sharia, Agriculture, Genetic Engineering, Environmen

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Introduction

We praise Allah, we seek His help and His direction. All prayers and peace be upon the Seal of the Prophets and Messengers who taught to till and develop the land, and made it an ongoing charity for its owner. The next step: The agriculture sector is the backbone of food security and economic sovereignty of the States. In the current technological acceleration, agriculture is no longer limited to sowing seeds in the soil and watering them; it has become entangled with genetics, biochemistry and digital systems, and thus created new problems that previous jurists have not encountered in their current form.

Significance of the Research: The significance of this study is related to the urgent need to clarify the Sharia rulings on issues that have an impact on people's lives and food such as genetically modified crops, hydroponics, and dealing with global agricultural companies. This needs disciplined jurisprudential reasoning with a touch of authenticity and contemporaneity in it.

Research Problem: The problem is the gap of knowledge in the constantly evolving reality of agricultural technology and the traditional description of jurisprudence. This begs the question of whether or not general principles of jurisprudence are enough to deal with the advancements in genetic engineering and contemporary agricultural finance arrangements and what checks are in place to determine the permissibility of such practices.

Research Hypothesis is that the basic ruling in the modern times related to agricultural means and technologies is permissibility until harm or danger is proven and that jurisprudential maxims like

"hardship begets facility" and "harm must be eliminated" represent a basic reference for addressing these modern issues.

Research Questions:

1. What is the exact idea of the issues in the agriculture today?
2. What is the Sharia ruling of improving crops by using genetic engineering.?
3. What are the jurisprudential features of present-day investment contracts in agriculture?
4. What is the effect of modern technologies on the rulings governing zakat on crops?

Methodology

The research method followed was inductive to trace and understand the nature of the issues of the present day, and analytical in discussing the views of the contemporary jurists and jurisprudential academies, with maintaining the academic integrity and accurate documentation.

Research Structure:

It is a research with three chapters. Chapter One discusses the jurisprudential foundations and genetic engineering, Chapter Two discusses contracts and zakat, and Chapter Three discusses the environment and the future prospects.

Results and Discussion

Chapter One: Jurisprudential Foundations of Contemporary Agricultural Issues and Applications of Genetic Engineering

Section One: The Concept of Contemporary Agricultural Issues and the Sharia Foundations for Juristic Reasoning Thereon

In order to address current problems in agriculture it is necessary to start with linguistic and technical analysis of the word to get a proper conceptualization of the subject. The word *nawazil* linguistically signifies a hardship which falls upon people and which must be resolved, which is the plural of *nazilah*. According to Al-Wansharisi[1] it is technically the incidents for which there is no specific jurisprudential ruling beforehand. If this concept is used for the agriculture field, it shows an integrated system of variables starting from seeds, to growth, irrigation, to harvest, and contracting. The reasoning of the jurists in dealing with such matters may not be arbitrary but must be subject to Islamic jurisprudence controls. In this context, the jurist must have a knowledge of reality that helps him to understand the nature of chemical fertilizers or the functioning of genes before giving a verdict[2]. It is under the umbrella of the overarching jurisprudential maxims that these issues fall. The most significant is the rule "the basic ruling concerning things is permissibility", because agriculture is essentially in the field of customs and transactions, and the scope of permissibility is wide in order to achieve the interests of the people. The importance of the essential goals of Sharia is however evident, particularly the preservation of life as the food relating to these developments can impact on the health of people. If this is the case, the decision changes from permissibility to prohibition, when harm is proven[3]. It is important to also take into account in the detailed discussion in this section the agricultural custom. The customs traditionally recognized by farmers in earlier times have been modified today and accordingly what were once legal opinions have also been modified. Some of the most prominent principles used by modern jurists to justify the use of modern technologies that enhance the yield of land and help stave off the threat of famine are that of juristic preference and unrestricted public interest, but juristic preference must not be based upon an imaginary interest.

The above-mentioned page was a continuation of a discussion of the Sharia foundations that a jurist would use when thinking about the current agricultural problems, such as the maxim, "blocking the means.

A jurist may lean toward prohibition if some agricultural research eventually results in biodiversity destruction or in the world's enterprise being the owner of peoples' food, thus preventing the means of harm to the national public interest [4].

Islamic Agriculture is not just an economic activity, but an act of worship and as a way to develop the earth. Contemporary problems related to it, therefore, must start from this broader notion which is connected with the notion of individual benefit and collective benefit. Moreover, the jurisprudential debate continues with the question of reclaiming land for cultivation with modern machinery, the ownership thereof and whether the conditions of ownership in the present day differ from those that were originally laid down by the early jurists by possession and enclosure. In modern reality (law and administration) there are laws and administration to control this and the modern lawyers say that it is necessary to obey the ruler in what does not involve disobedience, because it is an interest that is served by many people and there is no dispute between them [5]. The discussion also covers the issue of jallalah and how it applies in the modern era to the fruits of plants watered with chemically treated water or treated wastewater and about the disagreement of contemporary fuqahaa concerning the purity of the fruits and whether the impurity is assimilated in the plant's biological life or not.

While some found the fruits pure because the impure matter becomes another wholesome substance through growth, others were undecided when health harm was found [6]. Detailed discussion on these issues necessitates studying the opinions of the four schools of jurisprudence and then comparing them to the recent fatwas issued by contemporary jurisprudential schools so that there is a sound Sharia ruling that weighs the interests.

This page will now move on to explore the impact of technological development on the definition of "agricultural custom", and on the jurisprudential rulings. In legal theory, it is clear that a ruling is a movement, it exists with its effective cause, and it does not exist without its cause; and that custom has authority and is valid in making rulings, except when it is in contradiction with a text.

In modern agricultural problems new customs have come into existence with regard to seed, planting stock and irrigation system which were not known earlier. This necessitates reconsideration of some branches of jurisprudence which were founded on older custom. For instance, the scholars of jurisprudence laid down conditions for muzara'ah in terms of the nature of the seed and who was to provide it.

The question that arises whether the traditional conditions of muzara'ah exist in these new forms or not, with the dawn of the concept of contract farming where companies provide their machinery and seeds in exchange for a percentage of the crops or a fixed return. A detailed explanation on this page should be clarified on how Sharia serve as a facilitator of people's affairs.

In that case, modern-day agricultural contracts should be interpreted in accordance with the rule that "where there is hardship, there is facility" and at the same time, it should be taken great care that the contract is not usurious as well as that the contract is not grossly vague which can give rise to disputes.

Also discussed is the one on leasing agricultural land for money, which was controversial in the past but is the most prevalent case nowadays and an accepted custom to the benefit of both parties and to reduce risks. It is allowed today by contemporary jurists to help ease the people and livelihoods.

The purpose of this detailed explanation is to show the flexibility of Islamic jurisprudence and its ability to accept all the kinds of contracting involved in agriculture now as long as they do not contradict the spirit of justice and transparency in financial transactions.

This page's emphasis is on "agricultural ethics" from a modern jurisprudential point of view, which involves questions of the degree of responsibility that people have towards natural resources like water or soil, and thereby concludes Section One. The jurisprudential concept of no waste and protecting the rights of future generations is relevant here, as groundwater is being wasted in abundance for export agriculture, [7]. The modern jurist considers the "agricultural environment" a Sharia trust, and hence the use of

chemical pesticides which are internationally banned, or which have been found to be harmful to the soil and water, is forbidden under Sharia based upon the principle "harm must be eliminated" [8]. This section makes it clear that every issue of the modern times in the field of agriculture cannot be separated from moral and Islamic values. A quick gain might be sought at the cost of corrupting the earth, which Allah has purified and made an abode of worship.[9] It also speaks about the verdicts issued relating to the "agricultural monopolization" of seeds by global companies, the prohibition on monopolizing people's basic foods in Islamic jurisprudence and the responsibility of the state to intervene in this regard so that seeds and planting stock are provided at fair prices to small farmers. So, the overall foundations of present day problems in agriculture have been laid, and in Section Two, the most significant of these problems namely, genetic engineering and its biological applications have been detailed.

Section Two: The Ruling on Genetic Engineering and the Agricultural Modification of Crops

The practice of genetic engineering in agriculture is one of the most complex issues facing the modern jurisprudence. In simple terms, it refers to modifying the genetic characteristics of a seed to pass on desirable traits from one species to another. The jurisprudential description of this problem start with the question of its purpose, typically to enhance production or to ward off pests. Modern-day scholars believe that this technology is included in the notion of "unrestricted public interests" provided it is used for the purpose of satisfying humanity's necessity for nourishment. The general sharia evidence is a treatment and a livelihood; and genetic engineering may be a must in dealing with desertification and shortage of water. However, the big question is about the idea of 'changing the creation of Allah' that is referred to in the Sharia texts and whether this kind of genetic modification is included in it. Most international jurisprudential academies believe that it is not the same to modify plants as to modify living creatures that have a soul. To alter plants in order to obtain a rightful benefit is not a sinful alteration of God's creation but is one of the permissible uses of cosmic causes. It is crucial to understand that the permissibility of what is explained in detail here is not absolute, but dependent on the non-existence of harm. Once it is determined that it is genetically modified fruits that are harmful or the occurrence of chronic diseases, the ruling moves from permissibility to categorical prohibition based on the maxim "there shall be neither harm nor reciprocating harm. Patents on such modified seeds should also be addressed and the exclusive right of multi-national companies to patent such seeds and keep the poor out of replanting them, should be discussed. This unleashes a wide jurisprudential space relating to intellectual rights and the ban on the monopoly of basic foods.

This page follows on from the discussion of transferring genes from prohibited sources into plants, such as to make tomato plants resistant to cold weather by inserting a gene from a pig. This is an issue of "impurity" and "transformation. Some experts believe that the transferred gene is a really small and tiny microscopic particle that when it is part of the plant's genetic material it loses its original attributes. The maxim of transformation is therefore applicable to it: whereby an impure substance is made pure in becoming another honest and good substance.

A third group believes that the origin plays the most important role, and if the source is not allowed then it should not be used in the foods of the Muslims, so as to block the means of prohibition and to avoid doubtful things. An in-depth discussion on this question depends on the objectives of Sharia which should harmonize between the urgency of food and the preservation of the purity of the food. It is worth mentioning that jurisprudential academies have leaned toward banning transfer of genes from the prohibited animals to plants as far as this results in a change in the nature of the plant or leaves any chemical traces that can be detected by a Muslim consumer, to avoid the occurrence of unseen prohibitions to the consumers. The effect of these plants on the environmental balance is also addressed. The release of the modified genes in nature can make it possible to have harmful weeds that are not responsible to be killed by ordinary pesticides, which is "corruption on earth" and is forbidden in Sharia.

Jurisprudential responsibility entails that producing companies must submit a full environmental study before the seeds are released to market, and the ruler may forbid the circulation of these seeds when there is a high possibility that the soil, bees or biodiversity, a gift from Allah to His servants, may be harmed.

This page addresses the economic and contractual aspects of cultivating genetically modified crops, a contemporary issue relating to "contracts of adhesion." The companies with rights over these seeds impose strict conditions on the farmers such as restricting the farmers from keeping some of the seeds for the next season, forcing them to buy new seed every year.

The researchers believe that from a jurisprudential point of view this condition may clash with the effect of a contract of sale in which ownership is fully transferred to the buyer. But some jurists have allowed these conditions, under the name of what they call "innovative contracts" which balance the right of the innovator with the need of the investor from the point of view of "innovation rights" and the scientific effort invested. In the process of extending this explanation, "Muslims are bound by their conditions" maxim must be discussed and to what extent it is applied in the case of global monopoly.

Another question which arises in this context is that whether the zakat is to be calculated on the gross value of the crops or not? Is the high cost of the seeds and the technologies to be deducted from the gross value of the crops? Most of the modern jurisprudential opinions consider such costs as "debts" or as operating expenses, which must be deducted from what is subject to zakat before the one-tenth or one-half of the one-tenth is paid, thus relieving the farmer who is burdened with substantial costs. This section connects technology to the Islamic economy based on justice and banning the exploitation of others, and the importance of drafting laws at the national level to guard food sovereignty from the exploitation of other technologies that can be used as a political or economic weapon against the people of Islam.

Finally, Section Two considers the "future effects" and objective-based arguments about genetic modification. Some of the future challenges include growing human organs in plants and making medicine and vaccines in fruit. These possibilities call for jurists to be proactive in developing rules of governance. The judicial procedure is the balance of "interests and prohibitions". If, for example, a medicine for an incurable disease can only be produced by the genetic modification of plants, the jurisprudential rules of 'necessities permit prohibitions' may apply with the condition of observing Sharia controls in dealing with genetic material. The detailed explanation here emphasizes the need for "transparency and disclosure. According to Sharia, there must be labels in GM products, because the consumers must know what they eat. This is in accordance with the rules on sales and the prevention of deception and uncertainty. In Islam, the rules and regulations set by the Sharia, which involve the eating of wholesome provisions, prohibit any action that deceives consumers with regard to the type of provisions they are eating. Therefore, the Islamic jurisprudence's stance is that agricultural genetic engineering is "conditional permissible" depending on safety, transparency and economic justice. It integrates an incentivization of science with a defence of human beings against unbridled technologies which may favour financial gain over values and ethics.

Section Three: The Impact of Modern Irrigation, Fertilization, and Pesticide Technologies

One of the most important problems that affect the modern agricultural reality is modern irrigation and chemical fertilisation. The human being have been shifting from traditional flood irrigation to drip irrigation and automatic center pivot irrigation. From a jurisprudential point of view, these are called "means that assume the ruling of their objectives. The use of water saving technology to avoid water waste is recommended Sharia goal and can be assessed if it is a Sharia obligation if the areas of water scarcity are extreme, because the conservation of water is a Sharia obligation as stated in the verse "But do not be wasteful" (Al-Quran S. Al-A'raf, v. 31, Al-Quran S. Al-Isra, v. 31, Al-Quran S. Al-Mumtahanah, v. 26, Al-Quran S. Al-Juma'ah, v. 32, Al-Quran S. Al-Waqi'ah, v. 78). The conversation continues on the decision about "shared water" and how that water is distributed through the use of modern technology and whether water that has been saved using those technologies can be sold, if it was saved for agricultural purposes. The jurists believe that once water is secured and taken under control by means of equipment and machinery, it becomes not only private property but can also be sold and bought as such; the rule of common ownership does not apply to it, as it does to the flow of water in a stream. The price of these systems and its impact on the zakat on agricultural products are also discussed. Sharia makes a difference between the land that is watered by rainwater and one-tenth is due, and the land

watered by machine and one-half one-tenth is due. The confirmation of the need to use the rate of one-half of one-tenth is to ease the burden on a farmer who has invested in technologies, which serve the environment and help to conserve water resources, as modern technologies will increase the costs of irrigation and maintenance.

The modern problem of chemical fertilizers and biological growth stimulants is discussed on this page. The fundamental goal of fertilization is the enhancement of yield and quality of the soils, and this is allowed and even encouraged, in the process of developing the earth. The issue, however, is chemical residues which can be poisonous in the fruit or salinize the soil in the long run. The jurisprudential ruling is based here on "anticipated harm." The law principle is "no harm can be remediated by an equal or greater harm. If chemical fertilizers are proven to destroy the fertility of the land for future generations, even if production is temporarily increased, then they are subject to strict controls and/or prohibition.

Another place the "jurisprudence of purity" comes up is in the case of organic fertilizers made from animal manure or treated wastewater. The detailed discussion is related to juristic opinion on a jallalah plant that has been nourished by the impurity. Most believe chemical and biological changes in the plant cause the plant to become pure, as long as the odor or taste of the impurity does not show in the fruit. The modern science of jurisprudence encompasses the "tertiary treatment" of wastewater, which is permissible in Sharia and is used to purify water for non-consumptive irrigation of crops, such as forestry crops, in order to maintain public health and ward off epidemics. This is the highest level of harmony between the requirement to make use of every drop of water and the sanctification of purity in a Muslim's life.

The topic of this page is dedicated to the complicated one called "insecticides and fungicides. Pesticides are one way of protecting crops and that protection of property is a necessity. However, the problem is the pesticide residues and their threat to human beings. The principle of the "considering consequences" is applied by the jurists: the judgment does not only take into account the elimination of the insect, but also what will become of the person who eats the fruit. The use of internationally banned pesticides or highly toxic pesticides is a sin in Sharia and a violation of the law which is deserving of discretionary punishment as it is tantamount to the slow killing of human life.

The "balance of the universe" is also discussed. Those pesticides which kill bees or beneficial insects act as a destroyer of the balance set by Allah in nature and to be a destroyer of the balance is an attack on Allah's creation. The discussion also covers "organic agriculture" as an alternative between Sharia and environment and how far the responsibility of the state and zakat institutions is for supporting organic agriculture so that people can get healthy foods. The Hadith of the Almighty, "Eat of the wholesome things We have provided for you" stipulates that the word 'wholesome' does not imply lawful, but also refers to being free from contamination and harmfulness to health as per Islamic jurisprudence.

So that the use of pesticides that is not really necessary, not following the rules and regulations of safety before the harvest, is deception and forbidden concealment under Sharia. The farmer is criminally and sharia wise responsible for any damage done to others due to negligence in using the technical safety standards.

This page brings together the "big picture" of agricultural technologies, under the rubric of the "jurisprudence of empowerment and stewardship" to conclude Chapter One. Use of technology in irrigation, fertilizing and pesticides needs to be guided by the compass of 'trust'. The human being is a steward on this earth, and the oldest occupation, which is most related to humane nature is agriculture. Thus, Islamic law differs from merely material frameworks by bringing up-to-date problems in agriculture under the ethical values. The concluding discussion in this chapter highlights the importance of "collective juristic reasoning" where the agricultural scientists and the Sharia scholars are involved in the process of giving fatwa, so that it is not separated from technological reality. It also reiterates that the "rule of necessity" should not be invoked as an excuse to relax health standards but should be translated into an impetus for scientists to seek biological alternatives to the use of harmful chemicals, including

organic fertilizers and natural pesticides, to reduce or eliminate reliance on harmful chemicals. The end of Chapter One leads to Chapter Two on "investment and major agricultural companies," and "modern zakat. The research thus goes beyond laying the foundations of the jurisprudence of biological matter – the seed and the technology – to laying the foundations of the financial and contractual issues of this important industry. Thus we have covered all aspects of the jurisprudential basis of the current problems of agriculture and we have affirmed that Islamic Sharia is a law of life that can be adapted to the most advanced technology in the era of science and can be used to guide it to serve human beings and maintain their dignity and health.

Chapter Two: Financial and Contractual Issues in Agricultural Investment

Section One: Agricultural Investment Contracts with Joint-Stock Companies and Modern Financing

One of the key financial concerns of the current economic system is the agricultural investment contracts. Investment is not a purely personal endeavor anymore, nor is it limited to the traditional contracts, but has been extended to transnational joint-stock companies. The jurisprudential characterization of these contracts starts from understanding the nature of the "joint-stock company" as a legal person and how the "joint-stock company" deals with land and production. From a fundamental point of view, the modern jurists believe that these companies are a form of a developed company in Islamic jurisprudence and in particular in an *inān* and a *mudarabah* partnership, and that the extent of the liability of these companies is limited to the shares of the capital.

In the case of agricultural investments by participation in the company's shares, the acts of the company must be allowed, and prohibitions exist in agriculture such as borrowing with interest to purchase equipment or seeds. The current challenge comes from the fact that majority of the big agricultural companies take bank loans from conventional banks which puts the Muslim investor in the dilemma of "mixed companies. The extended elaboration here needs to be clarified by saying that jurisprudential academies have set absolute limits on this kind of investment, such as that interest-bearing debt should not surpass a certain percentage, and that the proceeds from the disallowed investments be purified. This section also includes the "contract farming" between the companies and farmers which means that the company agrees to collect the entire production for a fixed price, while also supporting the farmers with technical assistance. An accurate description of the problem is needed that addresses the "selling what one does not own" prohibition while also recognizing the need for agricultural market stability and liquidity for small farmers. However, by analogy with the *salam* contract, which Sharia allowed as an exception because of need, jurisprudential rules permit such contracts if the type of crop, its characteristics and price are clearly determined so that there is no dispute.

Through these contracts the exploitation of land is manifested, which is one of the big objectives of Sharia: "development of the earth" so that economic resources do not go to waste. It is in line with the Prophetic guidance to bring uncultivated land under cultivation, and put human and material resources to work in the production of staple foodstuffs.

The study is further continued by explaining the modern financing instruments utilized in agricultural investment especially the financing instrument which is called the "agricultural investment *sukuk*. These are securities with shares of an existing or planned agricultural project, where the rulings are made by the rules of sharing profit and loss. The current debate relates to how the risks are apportioned between the *sukuk* issuer and the investors, especially given the changing natural conditions that affect agriculture, for example drought and pests. Lawyers believe that the agricultural *sukuk* cannot feature a capital guarantee by the *sukuk* issuer as this would make the *sukuk* an interest-bearing loan. A "promise to donate" or a "cooperative insurance" could however be applied to losses which do not stem from negligence. The explanation goes into detail about a "contemporary *muzara'ah* contract", which is done through electronic platform with no physical interaction between the landowner and the farmer. Jurist will use the rules established under "contracting between absent parties" and stress the need for legal documentation that

protects rights. Foreigners' or international companies' ownership of agricultural land is also investigated as a political and jurisprudential question that is linked to "national sovereignty" and the "public interest". Most of the modern jurists believe that the ruler can limit what is otherwise allowed with regard to foreign ownership if it results in external control of food resources or if it is harmful for the local farmers; this is based on the maxim: "the ruler's actions toward the subjects are contingent on their welfare". This section is connected to jurisprudential laws with the security needs of Muslim countries, highlighting that agricultural investment should not be used to force the countries in terms of subsistence and should be of economic independence of the country. The jurisprudential information posted on this page focuses on the conditions for the validity of investment contracts, in terms of consent, knowledge of the subject matter and elimination of gross uncertainty caused by the ambiguity of modern technical costs. The study then moves on to the issue of "investment in agricultural land via lease-to-own contracts. It is a new form employed by investors who do not have enough liquidity to acquire land and equipment. Then, an Islamic bank buys the assets and leases them to the investors, charging periodic rents to them that will cover part of the price, until the investors can eventually become the owner of them. The jurisprudential description of this issue must be distinguished between the contract of lease and the promise of transfer of ownership so as to prevent the "two contracts in one contract"[10] that is prohibited by Sharia. The rules are elaborated upon regarding the maintenance of agricultural equipment leased and who the responsibility would lie with, the bank as owner or the investor as lessee. According to the jurisprudential rule, maintenance of the essential structure is the responsibility of the owner, while the maintenance of the operating structure is the responsibility of the lessee if the lessee does not want to change the responsibility for the operating structure to the owner, unless the two parties agree in a way that does not contradict Sharia. In addition, extended "agricultural supply contracts" with big retail stores are looked at, along with penalty clauses for late delivery or the substandard quality. According to jurists, a penalty clause in the financial contracts, other than loans, is acceptable if it is to compensate for real harm and not for an unjustified profit. A detailed discussion in this section is intended to explain that Sharia wants to control the market and thwart the manipulation of the market. So problems related to crop quality and related technology, like IoT in Agriculture, are evidence in contractual conflicts. These technical means are relied upon by the modern day jurist as "evidence" in adjudication. It is a step in the "jurisprudence of evidence" surrounding current agricultural investments, in which documented soil and climate conditions are part of the proof in claims for hidden defects or crop deterioration.

Section One ends with a section on the "agricultural investment funds" and how they can assist financing of big projects for the country. Such funds are for the purpose of gathering small investors savings and using them for projects of reclaiming uncultivated land or integrated livestock and crop-production. The problem here is in relation to the "management fees", and how they are to be determined: Can it be a percentage of profit in a *mudarabah*, or a fixed amount in an agency-for-fee? Both forms are acceptable to the jurists, however, they prefer the profit sharing one, as it encourages the manager to optimise the production. The section also deals with the "systemic risks" that could cause the fund to be liquidated and the Sharia rules for allocating assets, such as equipment, trees and land, among shareholders. The detailed explanation focuses on the principle "gain accompanies liability": not all losses are to be borne by small investors while the profits are to be kept by management and vice versa [11]. One of the most complex jurisprudential issues is determining on a liquidation whether the underlying land has been converted into produce. The land should be valued at its market value on the date of liquidation and its value distributed, subject to the rights of the parties in standing crops to be harvested at that date. This is on the basis of the jurisprudential principle that until harvest, the crop belongs to the person who planted it, unless otherwise agreed upon, the landowner is entitled to fair rent. Thus we have discussed the investment and financing aspects, which can be complemented by 'agricultural insurance' as an important issue to be discussed in Section Two, which is the issue of the day: 'agricultural insurance' – a must in the face of natural disasters that can wipe out the financial and human effort invested in developing and cultivating the land.

Section Two: Cooperative and Commercial Insurance of Crops and Livestock

Natural and climatic risks are the ones of the highest concerns for agricultural investors because crops are

helpless to the weather and the pest that can wipe out financial and human efforts at any moment. Thus, agricultural insurance became a tool to safeguard the agricultural wealth against loss or damage. The jurisprudential description of this question starts by making a precise distinction between commercial insurance, an exchange based on probability, and cooperative insurance, based on solidarity and donation. Most modern jurists have recognized that commercial insurance as traditionally practiced is overly risky and gambling. A farmer pays premiums and does not have a guarantee that he will be paid, and even if he is paid, it may be much more than what he pays, therefore suspicion of usury and unassuredness, which is forbidden in Sharia, arises[12]. A detailed explanation on this topic, it is necessary to say that in commercial insurance there is uncertainty with regard to the existence, amount and term, so that, in the opinion of many jurisprudential academies, the contract is not valid. However, there was a strong demand to ensure food security and also to find an alternative which is not prohibited by Sharia, but is still considered to provide protection, so that jurists tried to find an alternative to ensure food security. The other option was "cooperative insurance" otherwise known as *takaful*. This system is based on farmers contributing to a donation fund whose money is allocated to compensate any participating farmer who suffers harm. The fund is handled at a particular fee, or a portion of investment gains, although the payments are not to take away the principal asset. This characterization takes the contract out of the realm of exchanges and into the realm of donations in which, according to the jurists, uncertainty in donations is tolerated. The discussion in this section is in detail to highlight that cooperative insurance attains the objective of "cooperation in righteousness and piety" and averts the failure of big agricultural projects which is one of the main pillars of Islamic economy. Also covers compulsory insurance which may be made on some of the strategic crops by the state. The jurists believe that it is permissible to comply as it is in the public interest without restriction and the duty of the ruler to regulate permitted matters in a way that would bring benefit to people and prevent harm to the community.

This page extends the consideration of cooperative insurance applications to "livestock" and wealth in the shape of animals involved in farming. Epidemics or natural disasters leading to herd losses, is a legal matter which calls for a joint solution. The issue of "compensation" and the degree of fairness it represents is discussed. The compensation in Islamic insurance should be restricted to the direct damage and should not be for making profits out of a disaster. What is called "profit from insurance" is forbidden by jurisprudential rules, as the purpose of the contract is to compensate for harm and not to make money[13]. The agricultural *takaful* funds also utilize the concept of "reinsurance" which is also discussed. This is a fairly complicated procedure that could involve global commercial reinsurance firms. In today's jurisprudence, it is allowed when it has the characteristics of "necessity" or "general need" that takes on the legal character of necessity where there is no Islamic alternative that can take the continuous risk of national projects. The detailed explanation also clarifies the part of the "insurance surplus" (that is, the surplus of the cooperative agricultural funds after payment of all compensation and costs). According to jurists, this surplus should be returned to the participating farmers in accordance with the participation rate in the season or can be carried over to the next season, in order to adjust the premiums. This is a confirmation that the fund is "cooperative" in nature, and that it is not "commercial" in nature. These insurance systems can be justified as a protective fence to shield farmers against market volatility and the loss of their productive ability, as the maxim goes: "private harm is borne to avert public harm. It also highlights the importance of continuous monitoring in the application of Sharia and technique in determining the value of damage in field crops or agricultural facilities such as Greenhouses and center pivot irrigation systems and the absence of concealed usury or injustice in the procedures..

This page deals with the so called price insurance, hedging against the fluctuations in the price of the agricultural products in the world stock exchanges. A sharp drop in prices can lead to farmers being driven to bankruptcy due to the quality of the harvest. Options and futures contracts are then a kind of financial insurance. The jurisprudential description of these instruments is generally more prohibitory, because they are uncertainty and gambling instruments, where there is no actual delivery or receipt of the crop involved, only wagers on prices. However, today's lawmen want to find Sharia-compliant solutions like "salam contract" and "earnest-money contract" in order to guarantee the stability of price for

protecting producers and consumers. The detailed discussion elaborates on the possibility of using salam as simultaneous financing and insurance. The farmer gets the price in advance to allow him to cover the costs and the purchasing company gets a future price secured. The jurisprudence which regulates salam (such as paying of the price in the session of the contract and the exact determination of the quality and quantity) is a security against dispute and injustice. Also discussed is the question of "calamity" and what happens to agricultural contracts if a calamity arises. The jurisprudential rule has been in existence for a long time and is often used in modern practice. If the crop is destroyed due to a natural pest which is not in the farmer's hands, the amount lost because of the calamity should be deducted from the purchaser's account or the farmer should be paid from the funds of the Zakat or Cooperative insurance. This linkage between the classical jurisprudential principles and the technical and structural reality of the farms of today shows the flexibility of Islamic legislations and how it is able to protect financial rights under the most severe of nature's conditions. The conditions for "remission due to calamities" and their use for perennial and seasonal crops, as well as for modern technologies like satellite imagery as conclusive evidence in determining calamity and estimating its amount are also touched on in the discussion on this page. Judicial conflicts are minimized, and swift justice is provided between the parties in an agricultural contract.

The Section Two ends with a discussion of the "tort liability" in agricultural insurance, which relates to the right to claim compensation in case of damage resulting from technical negligence or application of uncertified seeds. The legal principle that "damage to crops is damage" extends to the agricultural engineer and the liability of the fertilizer company and farmer. The legal community believes that insurance should not apply to the damage caused by negligence or by failing to follow the rules of good agricultural practices, because otherwise there would be the possibility of financial corruption. The detailed explanation tackles the issue of "judicial expertise" for the purposes of determining where the damage was caused and whether it was a natural disaster (force majeure) or due to human negligence. The case of "insurance of agricultural patents" and their protection from piracy or imitation at the expense of the innovative investor is also explained. According to the jurists, intellectual rights are protected by Sharia and can be insured in the cooperative framework to ensure and preserve the scientific effort that helps in ensuring food security[14]. At the end of this section the stress is laid upon the fact that the agricultural insurance system in Islam is not only financial but it is a moral system as well. It is supposed to ensure the continuity of production and stop people from falling into destitution and it commits the Islamic government to the sponsorship of these funds and to provide technical and financial services from the public treasury or the funds of zakat if a person is in dire need. Thus we have laid the foundation for the financial protection of an agricultural project and we are now ready for the most important devotional financial pillar related to agriculture: "zakat" according to modern costs and contemporary technologies that have changed the financial calculations in connection with the crops and fruits.

Section Three: Zakat on Crops in Light of Production Costs and Modern Technologies

Zakat on crops and fruits is one of the most significant financial duties related to agricultural operations and today's problems are also recurring along with the changing agricultural techniques and costs. One of the basic sharia rules in calculating the amount of Zakat is that, the crops that are watered by rain are the ones on which one-tenth is paid, while the ones that are watered with paid money and machines are the ones on which one-half of one-tenth is paid. This is from the saying of the Prophet, peace and blessings be upon him: "One-tenth of what is irrigated by the sky and springs and one half of one-tenth of what is irrigated by water from a dug well or a drilled well is due. What is the problem in the modern times is that today's agriculture expenses are not limited to "irrigation machinery". These costs include hybrid seeds, chemical fertilizers, pesticides, labour wages, transportation costs and refrigerated storage costs. Consequently, a jurisprudential issue arises whether these costs are deducted from the crop prior to calculating the amount of the zakat? How do modern irrigation techniques (drip, sprinkler) which reduce water consumption, but increase establishment costs, impact? On the basis of the opinion of Ata and Makhul among the early scholars, a group of contemporary jurists believes that all "debts" and

production costs must be deducted from the gross crop and that zakat must then be paid out on the net amount if it reaches the nisab [15]. This detailed explanation of the view is derived from the main concept, namely "zakat is growth" and growth does not occur unless costs have been recovered. These significant costs may be either the major portion of the farmer's earnings or may result in a loss if the gross crop is made subject to the payment of zakat, which is not in line with the goal of zakat to ease the muzakki. The explanation on this page helps to clarify the basic distinction between "recurring annual expenses" (e.g., fertilizer, labor) and "fixed assets" (e.g., machinery and pumps). Contemporary jurisprudential thinking is to only deduct the direct operating costs in order to protect the poor person's right in the crop without causing harm to the person paying zakat.

This page will continue the discussion of the question of the "nisab" and the way it is calculated in the modern paper currency. According to the nisab for crops, it is five wasqs which is about 653 kilograms of grain. The problem is with crops that are not measured by volume and non-stored crops like vegetables and fruit, in which contemporary jurists have extended the liability of zakat in keeping with the general wording of the statement of the All-Mighty: "O you who believe, spend from the good things which you have earned and from that which We have produced for you from the earth. According to the jurists, the nisab of these crops is determined based on the value of the country's least valuable staple grain, which is the nisab for them. The question of "zakat on large farms" belonging to companies and whether the zakat is paid on the entire production or on the part of the owner is discussed. The contemporary juristic opinion is that the management of the company, as a legal person, is responsible to pay the zakat on behalf of the shareholders, so that the assessment and distribution are facilitated. The effects of "digital technologies" on the calculation of zakat is also discussed. Agricultural management software allows the calculation of costs and revenues with utmost accuracy that means farmers need not struggle with a practice known as khars which is a conjectural assessment carried out earlier. The purpose of the detailed discussion in this section is to clarify the current practice of "contemporary khars" based on digital data and automated harvest report. This is a development of the means without changing Sharia goal to hasten benefit to those in need. The conversation is further elaborated to the period when zakat is due to be paid for crops grown more than once in a year, namely the crops grown in the green houses. The jurists say that if the total of the crops is above the nisab then it is permissible to take zakat from them at every harvest, and it is also permissible to combine several crops over a year in order to ease the burden of the person from whom the zakat is to be taken and to maintain the rights of the destitute in the long-term fruit of the land.

This page is dedicated to discussing the "combination of irrigation methods" and the impact it has upon the 10% or 5% amount due. Modern farming often includes irrigating half the year with rain water (on which one-tenth is due) and half the year with very expensive center-pivot irrigation (one-half of one-tenth is due) and providing some supplemental irrigation. If this is the situation, then the rule of "predominance" is applied by jurists. One-half of one-tenth is due if irrigation is predominately by equipment, and three-quarters of one-tenth or 7.5%, if the two methods are equal. The detailed explanation deals with irrigation by desalinated water or treated waste water, which are very expensive. The jurists are in agreement that this cost is worth paying half of a tenth. Some modern jurists have gone so far as saying that in exceptional cases where the costs are the greater part of the value of the crop, "net profit" should be taken into account. The zakat of "soilless agriculture" (hydroponic cultivation) which is one of the modern technologies of agricultural laboratories is also discussed. Researchers believe that the question of whether they are the result of "production from the earth" (in fact or by legal characterization) is the determining factor in rendering these crops liable to zakat on crops and fruits, and draw attention to the high cost of nutrient solutions and artificial media. The wider legal reasoning is related to the revealed texts with the development of science, where the Sharia does not impose more on the producer as a result of technological advancement in order to make it easier for the producer, but in a way that ensures social justice. This page also clarifies the verdict as regards "fodder" and crops that the farmer grows for the livestock that he owns and the question as to whether the payment of zakat on the crops is required or the payment of zakat on the livestock is enough. Jurists lean towards not duplicating the zakat. If used for

internal consumption on the farm no independent zakat is due on it, but if it is meant for sale and trade, then at the time of harvest the zakat on crops will be due.

This page completes chapter Two of the book with a discussion of the "categories of recipients of zakat on crops in the modern era" and the function of the payment of zakat in relation to food security. The giving of zakat is not only limited to giving a grain to a poor person. It can be applied to the "transfer of ownership of production tools" to poor farmers, including the purchase of seeds, small irrigation equipment etc. This is called "zakat investment" whereby the poor person becomes a producer instead of a consumer[16]. The last part of the discussion points to the necessity of introducing special "zakat funds" in modern situations that have the knowledge and experience to determine the costs and equitably distribute surplus funds. Also, it brings attention to the forbiddance of evasion of zakat through manipulation of the costs and that the blessing in the production is dependent on the fulfillment of the right of Allah over it. The conclusion of Chapter Two is that although modern technology is complicated, it has helped in the calculation and ease of distribution of the zakat, while Islamic jurisprudence has proven its ability to save the farmers from exhaustion and conserve the right of the poor. In this way, we have discussed all financial, contractual, and devotional aspects of agricultural investment and set the stage for Chapter Three, dealing with "environmental responsibility" and the "future prospects" of current issues facing agriculture in the light of climatic changes and international legal developments.

Chapter Three: Environmental Issues and the Future Prospects of Agriculture

Section One: Hydroponics (Soilless Agriculture) and Its Jurisprudential Characterization

One of the most evident technologies revolutionizing the concept of agricultural production is hydroponics. No natural soil at all but instead inert media and nutrient solutions in water. The first question that arises in the jurisprudential description of this problem is the definition of "land" in the shariah and whether in order to be categorized as agriculture the land must be soil. Modern scholars believe that the key aspect in the agriculture is the growth and the production of fruit, whether it be in clay soil or by water, according to the general meaning of the words of the Almighty: "and Who bringeth forth pasture". The explanation of this point requires to be detailed by showing the achievement of the higher Sharia objectives of hydroponics, such as conserving water up to 90% and achieving production in places that are not suitable for farming, such as rooftops and deserts. Here, the applicability of the rules of "reviving uncultivated land" to the hydroponic facilities is discussed. While in the past, soil was used as the foundation of revival, in hydroponics the technical apparatus and the location becomes the essence of the investment. The right to production here is not based upon the ownership of the land in its simple traditional sense, but rather on ownership of the facility and the water (Ibn Taymiyyah). The technical differences between an open irrigation system and a closed irrigation system, and the impact of this on the stability of the jurisprudential ruling, is also discussed in detail. The growth rate and growth quantity of these systems are higher and more profuse, which questions what is meant by 'blessing' and what impact intensive human interventions have on the natural life cycle of the plant. The jurist affirms it as the use of reason and harnessing of the cosmic causes that Allah has laid out in order to develop the land and make the staple foods available to man.

This page is a follow-on of the "purity of nutrient solutions" that were discussed in hydroponics. These solutions are composed of mineral salts and chemical elements, with the possibility of adding organic extracts. The question is whether they are pure or not and if they do make the plant described as *jallalah*. The principle that controls the rulings for chemicals and salts is purity, unless proven conclusively to be tainted by a banned substance. Even though organic waste is utilized, the biological process in the hydroponic system creates a "transformation" process, where complex substances are converted into simpler substances which are absorbed by the plant and become part of its pure tissue. An elaboration of the difference between "soiled by uncleanness" and "soiled by nourishment". Hydroponically grown fruit is grown in a clean environment and is one of the healthiest types of provision. The question about the "zakat on hydroponics" is also discussed, whether it is calculated as "zakat on crops", one-tenth or one-half of one-tenth, or as "zakat on trade goods". Most modern jurists would lean towards deriving it from

crops and consider it as a form of zakat on crops, noting that the costs of operation of equipment and solutions are very high, before paying the obligatory amount. The detailed explanation also elaborates on the role of "greenhouses" and controlled climates in this type of farming and how continuous farming all year round is regarded from the Islamic point of view as a blessing for which gratitude is due and the payment of the zakat is due at each harvest, if it is at the nisab. This enhances the impact of the technology in reducing hunger and poverty in the Muslim societies faced with the shortage of fertile land.

The study continues on this page to talk about the impact of hydroponics from a Sharia perspective on "environmental and health effects". The principle of jurisprudence "there shall be neither harm nor reciprocating harm" must be verified that this technology is not going to upset the natural balance or particular microbes that would be spread in the aquatic medium. Lawyers believe that the application of health safety in agricultural laboratories is inevitable and is a Sharia obligation because it is a means of safeguarding life. The detailed explanation speaks to the "taste and quality" and whether hydroponic fruits "differs" from soil grown fruits in ruling for the "wholesomeness." The researchers believed that the most important point is the end result and testing in the laboratory that the fruits are free from contaminants, which falls within the general rule of permissibility[17]. The page also discusses "contracts for the supply of hydroponic systems" that are composite contracts comprising sale, lease and manufacturing. The modern day jurist defines these contracts based upon "custom" and the usual practice of technology companies, and reiterates that the contract must be clear on the equipment specifications or expected production levels. The wider legal argument is that this type of farming is efficient and thus a matter of "food security," a social duty of the country. The state should encourage hydroponics and make its technical alternatives available to farmers if food cannot be supplied by conventional agricultural practices. This page is also the one that explains the Ruling on the use of Desalinated Sea Water in Hydroponics, and the jurisprudential horizons that open up regarding "ownership of the seas" and the exploitation of their resources within the field of agriculture. It states that anything which increases green space and lessens the severity of hunger is allowed by Sharia.

This page is the end of Section One, which discusses the concept of "tort liability" in hydroponic systems. Who is responsible if the crop is destroyed due to pump failure/ contamination of solution? The jurisprudential principle "who gains from production, risks the technology" means that the farmer who receives the benefits of the production assumes the risk of the technology, unless the negligence of the supplying or supervising company is proven. The concluding discussion in this section highlights the fact that hydroponics is not just a technical choice, but an environmental imperative in the era of climate change. One of the recommendations of jurists is that it is necessary to have "Sharia controls for hydroponic production" that ensure awareness of the fair distribution of such technology and prevent it from being monopolized [18]. It is also noted that this type of agriculture now becomes a new paradigm in the human relationship with water as an element of life and production, and as a commandment of Allah SWT regarding strength, namely "Prepare against them whatever force you can". This section ends with the preparation of the next section which is "legal and sharia protection of agricultural patents". In hydroponics, where the majority of the innovations are registered and legally protected, there are issues about intellectual rights and the banning of infringing or monopolising these in the name of the hungry.

Section Two: Legal and Sharia Protection of Agricultural Patents and Innovation Rights

Agricultural intellectual property and patents are some of the most complicated issues of the modern world, and they refer to creation of new seeds or smart irrigation systems. The jurisprudential classification of this issue starts with the notion that the word "innovation" is legally recognized property as per Sharia, and this has been agreed upon by the jurisprudential academies today. The jurisprudential principle: 'intellectual rights are protected' protects the efforts of the researcher and the inventor from theft and imitation. However, an inventor's claim to profit is in conflict with society's need to have inexpensive food. The discussion says that Sharia is a balance between the interests of the private and public. It allows patenting for a limited length of time, so that the inventor can recoup costs and make a reasonable profit, and then the technology becomes common property of humanity. It also takes up the

question of "seed monopolization" by transnational companies, who put in restrictions on the replanting of the crop produced by the farmer. Some of the jurists consider this state as unfair and not in accordance with the effect of the sale contract, while the others allow it due to "general needs" that require the encouragement of scientific research, but not to the point of becoming a "prohibited monopoly" which results in price increases at the expense of the Muslim public[19]. In this section it is explained that an agri-patent is not a tool of economic tyranny, but a tool of development with human needs as limits.

This page is a continuation of discussion about "Sharia responsibility for imitating protected seeds" and technologies. The violation of an agricultural patent is considered as an infringement of the intellectual property and an encroachment on another person's right of ownership, and it is considered an act that imposes liability and compensation in Islamic jurisprudence. The issue of "agricultural copying" and the production of derivative varieties without authorization by the original inventor and the possible evaluation of material and moral damage are discussed. According to jurists, the judge is entitled to determine the compensation amount based on the maxim "harm must be eliminated," and based on the actual profit loss of the inventor, as was done with Abu Ghuddah in The subject of "public seeds" or public programs for sharing agricultural patents (Open Source Agriculture) is also explored and how it is in line with the spirit of Sharia in sharing beneficial knowledge and the prevention of monopoly of staple food is analyzed. The detailed explanation points to the concept of the "public treasury" (or state) acquiring patents of significance for food security and releasing them to farmers free of charge or for a nominal price. This is a modern example of the doctrine of "unrestricted public interests. This is continued to international agreements including TRIPS Agreement and their compatibility to Islamic jurisprudences. It reaffirms that the Muslim is bound by the international agreements which will not allow him to make the prohibited lawful nor to make the lawful prohibited and points out the necessity of amendment of some of the provisions which involve the continuity of food dependence, which is weakening the power of the Muslim farmers to compete in the International market.

This page is about "patents relating to genetic modification" and the ethics of owning plant life. Patenting of natural genes is a huge issue of jurisprudence and law. Judges believe that Allah-created genes in plants belong to everyone, and cannot be owned, but the "technical process" in which these genes are tweaked or rearranged in an innovative way can be protected. The detailed explanation emphasizes against "biopiracy", where companies going to Muslim countries collect indigenous seeds, make some developments in them, register them as patents and prohibit the use of them by the original owners of the countries. In Islamic Sharia these acts are considered "injustices" and as "eating" of people's wealth. There must be protection of the country's resources and the rule of jurisprudence must not be violated by transferring those resources to foreign entities through any type of legal loopholes. The section also looks at "fair compensation" for local communities that have maintained biodiversity and how investment contracts might be designed to ensure the rights of local communities if their seeds are used in genetic research around the world. The extensive discussion in this section is intended to explain that the concept of "distributive justice" lies at the very heart of present-day agricultural jurisprudence and a patent must not be a tool of a new colonialism that harms the livelihood of the poor through strict intellectual property.

Section Two ends with a discussion on the "legal and Sharia prospects" on how to protect agricultural innovation in Muslim countries. The need to create the "Islamic intellectual property system" which considering the particularity of Sharia and developmental needs. Jurists suggest that a measure for allowing small farmers to utilize the protected seeds on their own on the basis of the farmer's right, but not for commercial sale, should be introduced in order to guarantee the inventor's right. The concluding discussion highlights that the safeguard of innovation is a way to achieve the country's "technological empowerment," rather than simply an imitation of western law. It also points out that Sharia does not allow any patent on agricultural products that are harmful to health and the environment, since "no valid interest can be established in what Allah has prohibited." Continued agricultural development without sacrificing the values of justice and cooperation is only possible if the balance between the right of the innovator and the right of society is upheld; this is the only Sharia-based solution that can be found in the

conclusion of Section Two. After setting out the bases for intellectual rights, the conversation is set up for the third and final section: jurisprudential responsibility for harming the soil and water. The current agricultural activities can damage the environment seriously, where the responsibilities and guarantees of Sharia must be determined.

Section Three: Jurisprudential Responsibility for Harm to Soil, Water, and the Agricultural Environment

The preservation of the agricultural environment is the very essence of the goals of Islamic Sharia and attacking it through pollution or depletion is an attack on one of the "necessities" of life. The basic tenet of jurisprudential responsibility for harm to soil and water is "there shall be neither harm nor reciprocating harm. The term "chemical pollution" can be raised in modern agriculture because of the overuse of pesticides and fertilizers which destroy microorganisms in the soil and leach into ground water. According to jurisprudence, the farmer/company that causes such pollution is liable to Sharia, which is now known in the modern legal system as environmental liability. The detailed explanation section covers the method of valuation of the "compensation for diminution" of the value of land and water due to the pollution, and how Sharia demands the removal of the harm through remediation and restoration at the polluter's cost[20]. Also addressed is the "groundwater depletion" caused by big investors that leads to drying up of small farmer's wells. Jurists determine that a farmer's right to water is limited by the needs for non-infringement on others and the common good. The ruler can limit the pumping of groundwater and distribute fair shares according to the principle: the public good is paramount. The main idea of this section is to lay to rest the notion that "economic freedom" is an absolute thing in agriculture; that it is impossible to go too far.

The following is a continuation of the discussion of "criminal and civil liability" with regards to the use of prohibited or toxic agricultural substances. Selling agricultural products with pesticide residues which are above the tolerance level is prohibited fraud and violation of human life. The jurisprudential nature of this act and the question whether poisoning or chronic disease is "causing death" are discussed. A harsh discretionary punishment is to be imposed on the responsible party and blood money and compensation paid to injured persons, according to jurists. Also discussed are matters of "contaminated seeds" which are being used to carry disease from one country to another and ruin the national crop. If the supplying company is aware of the defect, or has been negligent in the laboratory tests, then it is fully responsible for the lost crop of the farmers. It is noted in the detailed explanation that "agricultural oversight" is a community responsibility and the farmers should follow the recommendations of agricultural engineers on "pre-harvest safety intervals. The conversation also goes on to the "effect of pollution on the purity of a crop" and whether certain chemical pollution of the soil makes the fruit unfit for eating. Chemical transformation and toxicity are considered the key factors. It is a ban if a fruit would contain which are sure to affect the life of the consumer, the crop must be eradicated and must not be sold to the society. This is the essence of hisbah according to the modern Islamic jurisprudence.

This page deals with the current topic "Climate change and its impact on contractual obligations in agriculture." Islamic jurisprudence deems extreme climatic events like drought and floods to be a "force majeure" or a "calamity". The rules for "remission due to calamities" and the amendment of the conditions of agricultural contracts such as the case of muzara'ah and musaqah in the event of the unforeseen climatic change are explained. The lawyers believe that there is a need for showing sympathy and mercy towards the farmers who have been affected. The ruler can rebalance contracts in a way that doesn't lead to the bankruptcy of producers and food flow disruption [21] A modern environmental and economic question, namely "carbon farming" and emission rights is also analyzed. Can a farmer sell "carbon credits" for trees planted? Jurisprudential thinking would be inclined towards the permissibility because the payment is not for a mere environmental benefit but it is a service which the farmer gives to the world and it would be called 'environmental service contracts. The in-depth discussion in this section would be helpful to clarify that today's agricultural law is heading towards a "sustainable agriculture", that is, a balance between production and resource protection, and that disruption of this balance brings

with its moral and financial responsibilities. The discussion is carried out and extended to the decision on "agricultural waste" including plastics and technical residues and the sharia ruling regarding recycling to prevent the waste of land. It is considered a type of the banned "harm" committed on roads and in Muslim fields because of negligence in disposing of.

Two final sections (Chapter Three and Section Three) discuss "future prospects and the use of artificial intelligence in agriculture. These technologies present current problems of "responsibility for machine decisions" in irrigation, fertilization, and medical diagnosis of plants. Under the "direct and indirect causation" rules, the owner and operator of the technology would be held liable if there were programming errors or misuse that caused harm to others. The concluding talk is about the importance of keeping agriculture technological development under "human and ethical control," so that it does not turn against people. The study suggests that the present problems of agriculture should be resolved by a "dynamic" jurisprudence which will not be confined to written documents, but will look into the cause and aim of the ruling. The end of Chapter Three says that the development of the earth by agriculture is one of the greatest ways of showing the gratitude for blessings and of doing the stewardship and that the keeping of the agricultural environment is part of the "trust" which was offered up to the heavens and the earth and which the heavens and earth refused to bear, but the human being bore it. Thus the three chapters of the research have been completed which covers all the aspects of the basic, technical, financial and environment angle of the problems of agriculture related to present era having a sound of jurisprudential frame of reference, true sources and detailed explanation which are needed to tell the story in the light of present academic purpose.

Conclusion

The research yielded a number of important results, including: In the light of the overarching maxims and essential objectives, Islamic Sharia is sufficiently flexible to integrate with the most modern techniques of agriculture current today, including genetic engineering and hydroponics. All agricultural developments are granted basic permission to be implemented unless it is proven to cause harm to health or the environment, and if it is proven to be harmful, it must be removed by making the responsible party liable. Intellectual rights and agriculture patents need to be respected as property rights under the law and regulation of monopolization of basic foodstuffs of people should be put in place. The costs of modern agriculture must be taken into account when calculating zakat by deducting debts and operating expenses in order to achieve fairness for farmers. To constitute a "Global Agricultural Fiqh Academy" consisting of scholars of Sharia and experts in agriculture sciences to provide an agreed fatwa today, Request Muslim countries to invest in "organic and sustainable agriculture" that will lower reliance on harmful chemicals, Create a national legal framework for safeguarding food sovereignty and local patents from global domination.

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