

FOUNDATIONS OF APPLIED RESEARCH IN THE HOLY QUR'ĀN: THE DIVINE MOTIVATION IN RESEARCH AND SOCIAL CHANGE

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ABSTRACT

This research addresses the concept, objectives, methods, and the Qur'anic basis of applied research and the role of this form of research in achieving social change. Cause and effect are shown in how the growing world population is reducing the lands for cultivation. Subsequently, food shortages impact on social ecosystem, social justice, and social change causing a major social problem. Applied research plays a vital role to cope with such problems and challenges. Applied research is used to find solutions to common problems. This research finds that the Holy Qur'ān does not mention applied research; yet there is a basis of applied research in it. The research shows the application of the Qur'anic motivation in applied research in order to social change through increasing agricultural commodities. It provides examples of the role of applied research in the field of agriculture in the United States of America, Bangladesh, and Malaysia to generate agricultural products. In addition, to demonstrate the application of basic, scientific, and applied research through a multi-disciplinary approach, the researchers describe how a team of scientists is currently working on the ambitious project in order to transform rice from a C3 plant into a C4 plant. This research is based on reviewing library resources. The researcher used three methodologies: inductive, qualitative, and analytical approaches.

Keywords: Holy Qur'ān, Applied research, Solutions to problems, Social change

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Introduction

Research is an essential and powerful tool in leading man towards progress. Without systematic research, there would be very little progress¹. Waltz and Bausell define research as “a systematic, formal, rigorous, and precise process employed to gain solutions to problems, discover and interpret new facts and relationships”². Meanwhile, Clifford Woody (1884-1948) states that “research is a careful enquiry or examination in seeking facts or principles, a diligent investigation to ascertain something”³. According to Woody “research comprises defining and redefining problems, formulating hypothesis or suggested solutions; collecting, organizing, and evaluating data; making deductions and reaching conclusions; and at last, carefully testing the conclusions to determine whether they fit the formulating hypothesis”⁴. Scientific approaches are used in research to uncover facts and offer solutions to certain problems⁵.

Academic research is the foundation of all types of research. It has been broadly dichotomized into two main types. (1) Basic or fundamental research and (2) Applied research⁶. Other types of research such as empirical, qualitative, quantitative, experimental, scientific, interdisciplinary, multidisciplinary, and other form are variations of academic, basic, and applied research. Scientists have divided forms of research into various types based on meanings, definitions, areas, disciplines, subjects, curiosities, problems, characteristics, importance, and goals of research.

Applied research is used to develop novel technologies, treat diseases, and discover answers to common problems. This type of research is designed to solve everyday problems of the modern world⁷. Meanwhile, basic research generates new ideas, principles, philosophies and theories in different fields of knowledge⁸. Basic research is also called pure research or fundamental research. This type of research tends not to be directly applicable to the real world, but enhances our understanding of the world around us. Pure research can be exploratory, descriptive or explanatory⁹.

¹ Prabhat, P., Meenu Mishra, Pandey. (2015). *Research Methodology: Tools and Techniques* (1st ed.): Bridge Center-Romania.

² Julliard, K. N., et al. (2000). Art-based evaluation in research education. *Art Therapy*, 17(2), 118-124.

³ Sahu, S. K., & Singh, T. J. (2016). *Research Methodology*. India: SBPD Publications.

⁴ Mishra, S. B., & Alok, S. (2022). *Handbook of research methodology*. India: Educreation publishing.

⁵ Islam, M. S., & Samsudin, S. (2020). Characteristics, Importance, And Objectives Of Research: An Overview Of The Indispensable Of Ethical Research. *International Journal of Scientific and Research Publications*, 10(5), 331-335.

⁶ Singh, Y. K. (2006). *Fundamental of Research Methodology And Statistics*. India: New Age International Publications.

⁷ Babbar, V. (2018). Application Of Critical Theory In Applied Research. *International Journal of Research in Social Sciences*, 8(7), 1.

⁸ Bhome et al., (2015). *Research Methodology: Tools and Analysis*. India: Himalaya Publishing House.

⁹ Islam, M. S., & Samsudin, S. (2020). Characteristics, Importance, And Objectives Of Research: An Overview Of The Indispensable Of Ethical Research. *International Journal of Scientific and Research Publications*, 10(5), 331-335.

The Holy Qur'ān is a divine message that motivates all types of development such as educational, spiritual, technological, economic, medical, resource management, political as well as social development to solve problems and improve humans' circumstances. In fact, natural ecosystem, social ecosystems, social justice, and social change are all inter-related. Food deficiency is also a social issue that leads to social problem. The Holy Qur'ān motivates us to solve problems and improve humans' situations. Hence, researchers intended to highlight the Qur'anic basis of applied research and its importance in solving to real-world problems.

Methodology

This research is based on reviewing library resources. The researcher used three methodologies: inductive, qualitative, and analytical approaches. Inductive approach is to collect verses from the Holy Qur'ān that relate to applied research. Similarly, this approach has been applied to accumulate sufficient textual data from various books and articles in applied research and social change. Qualitative method has been used to present different opinions why researchers conduct applied research. Analytical approach has been used to analyse the Qur'anic verses and scholars' opinions about applied research.

Concept of Applied Research

Applied research refers to scientific study and research that seek to solve practical problems¹⁰. Applied research is described as research whose results can be used immediately. This form of research is useful for current activities¹¹. Applied science focuses on the development of technology and techniques¹². This research is conducted to solve definite problems of the modern world, to improve the human condition rather than to acquire knowledge just for knowledge's sake¹³. This research is used in business, medicine, and education to find solutions that may cure diseases, solve scientific problems, and develop technology¹⁴. Applied research is also a way of finding solutions to specific problems or issues related to individuals, groups, organizations, and societies.

¹⁰ Johnson, M. K. (2016). Cognitive neuroscience: applied cognitive psychology. *Journal of Applied Research in Memory and Cognition*, 5(2), 110-120.

¹¹ Mukherji, P., & Albon, D. (2022). *Research methods in early childhood: An introductory guide*. United States: Sage Publications.

¹² Goldsmith, L. J. (2021). Using Framework Analysis in Applied Qualitative Research. *Qualitative Report*, 26(6).

¹³ Deakin, et al., (2014). Risk Assessment and Risk Management for Transportation Research (No. UCTC-FR-2014-01). University of California Transportation Center.

¹⁴ Flores-Vivar, J. M. (2019). Evolution and Trends in Teaching and Learning of Cyberjournalism. In *Organizational Transformation and Managing Innovation in the Fourth Industrial Revolution* (pp. 303-319): IGI Global.

Objectives of Applied Research

Applied research “aims at finding a solution for an immediate problem facing a society, or an industrial/business organisation”¹⁵. This kind of research is used to find solutions to everyday problems, cure illnesses, and develop innovative technologies¹⁶ but overall, the main goal of applied research is to improve the human condition¹⁷.

Basic research is typically driven by scientists’ personal interests and curiosity, and its purpose is to advance knowledge. In contrast, the purpose of applied research is to understand how to prevent or solve practical problems that affect “real” people, organizations, communities, and societies across the globe. Some types of applied research are descriptive and help advance our comprehension of real-world issues and their potential solutions, while other efforts are evaluative and improve or determine the effectiveness of actions (e.g., programmes and policies) to prevent and solve pragmatic issues¹⁸.

The goal of applied research projects is to create real solutions for very particular problems in fields like energy, health, or nutrition¹⁹. The aim of applied research is to increase scientific knowledge with a practical aim. In other words, the results of applied research will be immediately used for other advantageous purposes²⁰. The aim of applied research is directed on evaluating whether one variable makes a difference to another in the real world²¹. The central aim of applied research is to find a solution for actual problem which warrants solution for immediate use²². Because the main aim of applied research is to find out a solution for some critical concrete problems²³, applied research uses scientific theories to develop technology or techniques to intervene and alter natural or other phenomena. Applied research deals with solving existing problems and generally employs

¹⁵ Kothari, C. R. (2004). *Research methodology: Methods and techniques*. India: New Age International.

¹⁶ Babbar, V. (2018). Application Of Critical Theory In Applied Research. *International Journal of Research in Social Sciences*, 8(7), 1.

¹⁷ Deakin et al. (2014). *Risk Assessment and Risk Management for Transportation Research* (No. UCTC-FR-2014-01). University of California Transportation Center.

¹⁸ Donaldson et al. (2009). What counts as credible evidence in applied research and evaluation practice? United States: Sage Publication.

¹⁹ Konrad, T. S., & Konrad, T. S. (2018). Results of the Empirical Field Study. Management Control in Public-Private Partnerships: Between International Governmental Actors and the Private Sector, 161-376.

²⁰ Seventilofa, I. G. N. O. (2021). Enhance Vocabulary Skill Through Reading Repetition (Repeated Reading). *Ganec Swara*, 15(1), 1013-1017.

²¹ Finkenzeller et al. (2016). Biathlon shooting as a model from a biomechanical, kinesiological and psychological perspective—a multidisciplinary approach. *Science and Nordic Skiing III*, 95-102.

²² Patil, S., & Mankar, A. (2016). Research methodology: For beginners. *International Research Journal of Multidisciplinary Studies*, 2(1), 21-31.

²³ Mishra, S. B., & Alok, S. (2022). *Handbook of research methodology*. India: Educreation Publishing

empirical methodologies²⁴ to help clients (e.g., policy makers or organizational leaders) to decide on a particular situation, problem, or opportunity.

Method of Applied Research

In a study utilising applied research design, the researcher uses qualitative and quantitative instruments to collect data, such as questionnaires, interviews, and observation methods. They help the researcher collect real-world evidence, which is then tested, depending on the type of applied research and the main focus.

Applied research, according to Bickman and Rog, uses scientific methodology to develop formation to help an immediate, yet usually persistent, social problem. Mostly, applied research is commissioned by governments, businesses and industries, and charitable organizations with an interest in finding out about social problems as well as providing services²⁵.

Concept of Social Change

Social change refers to an alteration in the social order of a society. As a result of rapid industrialization, growing urbanization and changes in the human intellect, society needs to change in order to cope with these gradual changes²⁶. Social change is a process which results in some difference, alteration, modification, or replacement in the society. These aspects of change can be felt in terms of the existing ways of living, thinking, attitudes, relationships, structures and functions of society, and in the conditions of life²⁷. Any major change over time in social standards, cultural values, or behavioural patterns is referred to as social change²⁸. Significant changes in how people interact with one another and the culture in which those interactions take place are referred to as social change²⁹. Applied research, being a type of social research, provides solutions to problems that promote social change. Without solving problems, we cannot achieve expected social change to forward the conditions of life.

²⁴ Vafadar, A., & Ghadimvand, N. K. (2016). Advanced research approach for students of PhD in science and engineering, Department of Geology Islamic Azad University Tehran North Branch.

²⁵ Hall, N., & Hall, R. (2008). *Applied Social Research: Macmillan Education*. Australia: Elizabeth Vella.

²⁶ Chakraborty et al., (2018). Education as an instrument of social change and enhancing teaching-learning process with the help of technological development. Retrieved from https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Chakraborty+et+al.%2C+%282018%29,+Education+as+an+instrument+of+social+change+and+enhancing+teaching-learning+process+with+the+help+of+technological+development&btnG=. Date: 15 May, 2020.

²⁷ Matin, A. (2011). *Social Change and Planning*. India: Pearson Education.

²⁸ Jyoti, M. (2018). Social Change And It's Impact On Adolescents. *International Journal of Research and Analytical Reviews*, 5(4).

²⁹ Beck, D., & Purcell, R. (2020). *Community Development for Social Change*. England: Routledge.

Basis of Applied Research in the holy Qur'ān

Each and every part of creation is a significant subject of research to better utilize everything, whereas all that the earth contains is for humans' welfare. Therefore, Allāh SWT encourages us to do research generally on creatures in the universe. Allāh SWT says, "Have they not looked into the kingdom of the heavens (skies) and the earth, and into the things Allāh has created" [al-ʿArāf 7:185]. Furthermore, Allāh SWT says, "Say, look at what is there in the heavens (skies) and the earth. But signs and warnings do not suffice a people who do not believe" (Uūnus 10:101). This verse is basis of basic, applied, scientific, and other³⁰ types of research. Abou al-Layth al-Samar Qandi (333-373 AH) said in interpreting the Qur'anic verse "Say, look at what is there in the heavens (skies)" which means Allāh SWT says to His Messenger to tell humans that as they look at the signs of the Creator in the skies (the solar system, the sun, moon, and stars) "and the earth" which means things in the earth such as animals, mountains, seas, trees, and fruits. They should think, understand, and belief that these creatures show there is a Creator. Then Allāh SWT says about those who do not think, understand, and believe, as such, "But, signs and warnings do not suffice a people who do not believe" [Uūnus 10: 10131]. Which means they have not benefited because, they do not believe in the Creator through the "signs" or evidence which are in the skies, "and warnings" by the Messenger of Allāh. In addition, "people who do not believe" which means people who do not want to believe in Allāh, and do not ask the right things³².

Imad Uddin abul fida Ismail ibn Kathīr (701–774 AH) interpreted, Allāh SWT instructs His slaves to reflect on His blessings and what have been created in the heavens and the earth which are impressive for those seeds, which are in the heavens such as luminous planets, the sun and the moon, day and night, and their differences. Likewise, the high and breadth of the skies and what Almighty Allāh revealed from the rain that revives the earth after its death and energies it with fruits, crops, various forms of plant species, numerous types of flower species, different shapes and colours of animals, and benefits from them. Moreover, from the mountains and grasslands, the wonders of the sea, and the waves all of these indicates there is no another Creator without Almighty Allāh³³. In the heavens and on earth, resources are the subjects of basic, applied, scientific, and other forms of research. Therefore, this verse instructs humans to think and research into creatures and

30 Only Allāh Subhānahu Wa Taʿāla knows a verse carries how many subjects, solutions of issues, and messages. When a researcher understands that the verse is the foundation of basic and scientific research, he also believes that it is the foundation of other types of research that future research will reveal.

31 Al-Qur'ān, Sūrah Yunūs 10: 101.

32 Abou al-Layth S. Q, (n.y). *Tafsīr Bahru al-ulum*, (n.p), Vol. 2, P. 315.

33 Ibn Kathīr, Abū al-Fidā' Ismā'īl ibn 'Umar. (1999). *Tafsīr Al-Qur'ān al-'Aẓīm*. Reviewer: Sami Ibn Muḥammad Salamah, Saudi Arabia: Dāru al-Taiybatī Lin-Nāshir wat-Tawzī', Vol.4, P. 299.

other resources in the heavens and on earth in order to extend their knowledge by finding scientific information, hidden truth, facts, and so forth in order to find the solution to problems.

In these verses, Allāh SWT not only encourages but also emphasizes on studying, researching, making inquiry, investigating, examining into the creations and other things in the heavens (skies) and the earth. Allāh SWT motivates humans to think and research on resources to gain knowledge about components of the environment in the universe, realize the mastery of Allāh SWT in creating the universe, and develop relationships between Allāh SWT, humans, and the resources around us. The term 'sign' refers to all resources. The term 'warnings' reminds people to believe in the Creator, avoid mismanagement and misuse of resources or they will suffer from many types of social and natural disasters. After such warnings, people should be more careful, serious, responsible, ethical about resources, and researchers must discover solutions to problems. Humans should repeatedly examine their heart and soul to improve their status and solve problems. God does not change Man's condition unless they change their inner selves. The Holy Qur'ān reads, "*Verily, God does not change Man's condition unless they change their inner selves*" [ar-Ra'd, 13: 11]. This statement has both positive and negative connotations, i.e., God does not withhold His benefits from men until their inner selves return from being deviant, just as He withholds His gifts from deliberate sinners until they repent and become deserving of His grace. This serves as an example of the divine law of cause and effect (The Sunnah of Allāh SWT), which governs both individual and communal life and makes the development of civilizations dependent upon people's moral character and internal changes³⁴.

Man is not responsible and will not be asked about whatsoever is out of his ability. Allah SWT states, "*God does not burden any human being with more than he is well able to bear: in his favour shall be whatever good he does, and against him whatever evil he does.*" [al-Baqarah, 2: 286]. Ibn 'Abbās (RA) interpreted the verse that Allah declared: A soul is not tested by acts of obedience that fall outside the bounds of its capacity." Because it only receives what it deserves in the form of good, abandoning the soul's discourse, forgetfulness, error, and compulsion, and only receiving what it is due in the form of evil, the soul's discourse, forgetfulness, and coercion.³⁵. This verse encourages every person to obey Allah SWT and avoid all evil deeds to be an honest, ideal, hardworking, and responsible person. Correspondingly, it motivates scientists to apply their intellect and use their energy, resources, and time properly to develop new technology to be forwarded to future generations, to discover solutions to problems, to develop spiritually, and to promote social change.

³⁴ Asad, M. (2007). The e-text version of the book The Message of The Qur'an.

³⁵ Ibn 'Abbās, (2007). *Tanwīr al-Muqbās min tafsīr ibn 'Abbās*, Translated by Mokrane Guezzou, Edited and with a brief Introduction by Yousef Meri, Vol. 1, P. 64.

Application of the Qur'anic Motivation in Applied Research in order to Social Change Through Increasing Agricultural Commodities

The above Qur'anic verses are the basis of many types of research including applied research. These are the divine motivation on research and development. The United States Department of Agriculture (USDA) states on its official website that the Applied Research and Development Program (ARDP) is one of the three program areas under the Crop Protection and Pests Management Program (CPPM) that supports Integrated Pest Management³⁶ (IPM) research and extension projects³⁷. Definitely, it is the result of applied research in agriculture that has increased agricultural commodities (crops, live stocks, and fisheries) in the modern world. The world's food production grew dramatically, keeping pace with an alarmingly fast rate of population growth. To cite an example, there is Bangladesh. In 1971, the country had a population of 75 million and food production was a little over 10 million metric tonnes. Through adoption of modern farming technologies, policy support, better breeds, and inputs and above all a hard-working farming community, today Bangladesh grows over 35 million metric tonnes of cereal crops. Over the past four decades, Bangladesh has succeeded in outpacing the population growth rate with its growth in rice output. The country has more than tripled the production of its staple in the space of 45 years³⁸, ³⁹. Similarly, the source of Malaysia's official statistics states that in 2017, 33 agricultural commodities were covered and 16 of them recorded Self-Sufficiency Ratio (SSR) more than 100 per cent (Supply and Utilization Accounts Selected Agricultural Commodities, Malaysia 2013-1017).

Only 29 percent of the earth's surface is land⁴⁰ and only a little over a third of that is suitable for agriculture; the rest is ice, desert, forest, mountain, and unsuitable for farming. More simply stated, only 10 per cent of the surface of the earth has topographical and climatic conditions suitable for producing the food requirements of human beings⁴¹, ⁴². In addition, 60 per cent of the world's population lives in Asia, where each hectare of land

³⁶ Integrated Pest Management (IPM) is a sustainable, science -based approach that combines several management tools including biological, cultural, physical, and chemical tools integrated with the pest ecology science to identify, manage, and reduce the risk from pests and pest management tools.

³⁷ Applied Agriculture Research and Development Program. Retrieved from <https://www.nifa.usda.gov/grants/programs/applied-agriculture-research-development-program>. Date: 19 November, 2023.

³⁸ Ahmad, R. (2017). Sustainable Rice Production. The Daily Star, Feb27, 2017. Retrieved from <https://www.thedailystar.net/towards-just-and-inclusive-society/sustainable-rice-production-1367641>. Date: June 23, 2020.

³⁹ Altaf et al. (2019). Potential role of Plant Growth Promoting Rhizobacteria (PGPR) to reduce chemical fertilizer in horticultural crops. *Int. J. Res. Agric. For*, 6, 21-30.

⁴⁰ McLeish, A. (1992). *Geological science*: Nelson Thornes.

⁴¹ Ahmad, R. (2017). Sustainable Rice Production. The Daily Star, Feb 27, 2017. Retrieved from <https://www.thedailystar.net/towards-just-and-inclusive-society/sustainable-rice-production-1367641>. Date: 23 June, 2020.

⁴² Altaf et al. (2019). Potential role of Plant Growth Promoting Rhizobacteria (PGPR) to reduce chemical fertilizer in horticultural crops. *Int. J. Res. Agric. For*, 6, 21-30.

used for rice production currently provides food for 27 people, but by 2050 that land will have to support at least 43 people^{43, 44}.

Professor Jane Langdale, Professor of Plant Development in the Department of Plant Sciences at Oxford University, and Principal Investigator on this phase of the C4 Rice Project, said: 'Over 3 billion people depend on rice for survival, and, owing to predicted population increases and a general trend towards urbanisation, land that provided enough rice to feed 27 people in 2010 will need to support 43 by 2050'⁴⁵. Nonetheless, the area for rice cultivation is continually being reduced by expansion of cities and industries, to say nothing of soil degradation⁴⁶.

Therefore, for the past few years, scientists have embarked upon an uphill task of changing the biophysical structure of the rice plant, making it a much more efficient user of solar energy. Solar energy captured in photosynthesis over the duration of a crop gives it the capacity to grow. Rice has what is known as a C3 photosynthetic pathway, less efficient than that of maize, which has a C4 pathway^{47, 48}.

A team of scientists drawn from IRRI to Oxford University, from Chinese Academy of Sciences to Cambridge University, is now working on an ambitious project so that rice, a C3 plant, can be converted into a C4 plant. Oxford University released a statement stating, "If rice could be 'switched' to using C4 photosynthesis, it would theoretically increase productivity by 50 percent."⁴⁹.

The new study, published in the *Journal of Experimental Botany*, scientists stated: 'In this review we have explored the case for improvement of photosynthetic efficiency in C4 crops as a means to enhance productivity and yield. Despite the limited focus on

⁴³ Ahmad, R. (2017). Sustainable Rice Production. The Daily Star, Feb 27, 2017. Retrieved from <https://www.thedailystar.net/towards-just-and-inclusive-society/sustainable-rice-production-1367641>. Date: 23 June, 2020.

⁴⁴ Sheehy et al. (2008). Harnessing photosynthesis in tomorrow's world: Humans, crop production and poverty alleviation. Paper presented at the Photosynthesis. Energy from the Sun: 14th International Congress on Photosynthesis.

⁴⁵ Oxford University. (2019). Breakthrough in efforts to 'supercharge' rice and reduce world hunger. News & Events. Retrieved from <https://www.ox.ac.uk/news/2017-10-19-breakthrough-efforts-supercharge-rice-and-reduce-world-hunger#:~:text=If%20rice%20could%20be%20switched,plants%20to%20the%20C4%20pathway>. Date: 10 March, 2022.

⁴⁶ Montenegro de Wit, M. (2003). Rice: how the most genetically versatile grain conquered the World. Massachusetts Institute of Technology.

⁴⁷ Ahmad, R. (2017). Sustainable Rice Production. The Daily Star, Feb27, 2017. Retrieved from <https://www.thedailystar.net/towards-just-and-inclusive-society/sustainable-rice-production-1367641>. Date: 23 June, 2020.

⁴⁸ Chater, C., & Gray, J. (2014). *New Phytologist next generation scientists*. India: Wiley Online Library.

⁴⁹ Oxford University, (2019). Breakthrough in efforts to 'supercharge' rice and reduce world hunger. News & Events. Retrieved from <https://www.ox.ac.uk/news/2017-10-19-breakthrough-efforts-supercharge-rice-and-reduce-world-hunger#:~:text=If%20rice%20could%20be%20switched,plants%20to%20the%20C4%20pathway>. Date: 10 March, 2022.

improving photosynthetic efficiency in C₄ compared with C₃ species, there appears to be substantial evidence that this strategy may be achievable and beneficial for yield⁵⁰.

Scientists are conducting research repeatedly to invent methods to increase agricultural commodities as well as to preserve all types of resources that are blessings of the Creator to humans. God proclaims in the Holy Qur'ān that He is not changing and will not change Man's condition unless they change their inner selves if they are able to do so. Likewise, He is not punishing and will not punish humans by reducing His blessings unless they do evil things and be disobedient to the God. The Holy Qur'ān reads *“Verily, God does not change men's condition unless they change their inner selves; and when God wills people to suffer evil [in consequence of their own evil deeds], there is none who could avert it: for they have none who could protect them from Him”* (ar-Ra‘d 13:11).

This statement has both a positive and a negative connotation: i.e., Allah SWT does not withdraw His blessings from men unless their inner selves become depraved, just as He does not bestow His blessings upon wilful sinners until they change their inner disposition and become worthy of His grace. In its wider sense, this is an illustration of the divine law of cause and effect which dominates the lives of both individuals and communities, and makes the rise and fall of civilizations dependent on people's moral qualities and the changes in "their inner selves"⁵¹. Therefore, God commands us to help and encourage people to do good deeds and prohibits us from bad works. The Holy Qur'ān reads, *“Help one another in furthering virtue and God-consciousness, and do not help one another in furthering evil and enmity; and remain conscious of God: for, behold, God is severe in retribution!”* (al-Mā'idah 5: 2). In addition, to compete in good works as has been reflected in the Holy Qur'ān *“Vie, then, with one another in doing good works!”* (al-Mā'idah 5: 48). Solving problems and establishing peace in society are good works and great contributions. It is not easy to solve grave problems but it is not impossible. Researchers use interdisciplinary and multidisciplinary approach in applied research to solve problems in the present world. The Holy Qur'ān motivates us to do all types of good works including solving problems individually and collectively.

Conclusion

This research shows the basis of applied research in the Holy Qur'ān. This research refers to the United States America, Bangladesh, and Malaysia to cite country-specific examples of applied research in the field of agriculture to generate agricultural products. Rice plants are known as a C₃ photosynthetic pathway, which is less efficient than that of maize, which

⁵⁰ Sales et al. (2021). Improving C₄ photosynthesis to increase productivity under optimal and suboptimal conditions. *Journal of Experimental Botany*, England: Oxford University Press, 72(17), 5942-5960.

⁵¹ Asad, M. (2007). The e-text version of the book *The Message of The Qur'an*.

has a C4 pathway, a much more efficient user of solar energy. A team of scientists are conducting research on changing the biophysical structure of rice plants in order to convert a C3 photosynthetic pathway into a C4 pathway. According to the Holy Qur'ān, in order to protect resources from destruction, scientists from relevant disciplines have to identify natural disasters and their underlying causes that harm natural ecosystems, devastate resources on land and at sea, and pollute the environment both naturally and societally. Natural resources, familial ties, the overall environment, and human resources are eventually in danger. Moreover, the Holy Qur'ān motivates scientists to discover solutions to recognized causes of problem by conducting applied research. They must discover proper methods in order to maintain and increase the blessings of Allāh SWT. Man needs to improve the situation and avoid miserable conditions; hence, development in beneficial science and technology according to the needs of the people of the time is necessary. Humans should try again and again with all their hearts and souls to improve their status and solve problems. Solving problem and establishing novel phenomena in society are good works and great contributions. Really, it is not easy solving grave problems. But it is also not impossible. In order to solve some problems in the present world, researchers must use interdisciplinary and multidisciplinary approaches in applied research. The Holy Qur'ān motivates us to do all types of good works including solving problems, individually and collectively. As we know, basic research is conducted to increase our knowledge related to any branch of knowledge, natural and social ecosystems, natural and social phenomenon to know what is what and why. Hence, recognizing the problems and causes of these problems is basic research and finding the solutions for the problems is applied research. This is a prominent harmony between basic and applied research towards making social change.

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