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Green Horizons for 1.4 Billion

Background

China is the world's fifth largest land area, with 9,596,960 sq km (CIA, "Area - the World Factbook"). China's land mass is accompanied by the largest population of over 1.4 billion people (CIA). As of 2023, 35.4% of China's population lives in rural areas while 64.6% live in urban areas (CIA). The country possessed 54.7% of agricultural land by 2018 and 128.6 area of 10,000 sq. km by 2023 (CIA; "China Statistical Yearbook 2024"). China has been the number one country to fall victim to rapid urbanization since 2018 (Dyvik). China's rapid urbanization is fueled by rural-urban migration and economic growth (Borst). Urbanization leads to the conversion of farmlands as well as environmental challenges (Hou; Yao). To address these issues, setting land protection and urban-rural integration policies, promoting sustainable farming practices, and modernizing farming are vital. These remedies can help China manage the effects of urbanization to promote food security and improve environmental sustainability.

Average Family

The average family size in China in 2023 was 2.8 people (Statista). The average wage ranges from 1,120 yuan to 2,590 yuan converting to \$175 to \$405 in 2022 ("What Is the Most"). Every neighborhood typically has access to small food retailers (Li). They have access to rice, wheat-based products, corn, and soybeans as China is the main producer (Cui). Families typically buy food in local markets and supermarkets daily (Lin). Families do have access to education as it is obligatory for them to complete 9 years ("What Is Compulsory Education?"). "In China, the basic health insurance system covers over 95% of the population" (World Health Organization). Urban areas have better medical tech and expertise while rural areas have less medical expertise, professionals, and resources. Remote rural areas have less access to medical facilities in general ("2024 Guide to Health"). While education is free for the compulsory 9 years, 73% of education funds are for in-school expenses while 12% is for extracurriculars and tutoring. For higher-income households, only 10.6% of their income is delegated to education. On the other hand, lower-income families use 56.8% of their income (University). Rural-urban migration, people moving from rural areas to urban, results in "left-behind" children (Zhao). Sixty-one million rural children make up the "left-behind" children phenomenon which is 34% of all rural children (Zhao).

Problem

In China, rapid urbanization is a leading contributor to soil degradation (Chen). More than 40% of China's land suffers from soil degradation (Mancl). This fact underscores the significant ongoing environmental crisis. Soil degradation causes desertification, nutrient loss, and less land productivity (Delang). Trends are improving yet they still face challenges like population or pollution. China's agriculture has rapidly advanced, but is still faced with challenges such as "a huge human population; scarcity of agricultural resources; environmental pollution and degradation; underdevelopment of rural society and the rural economy; slow advancement and application of modern agricultural science and technology; and low-efficiency management mechanisms" (Zhao). These problems translate to diminished food availability, food quality, and an increase in food insecurity. As China harbors 1.4 billion people and its agricultural lands become less productive, it faces growing obstacles when ensuring food security for its large nation.

Solutions

To address soil degradation, China would need to implement stronger land protection and urban-rural integration policies. China's total arable land had decreased by more than 15 million acres from 2013 to 2019, which equates to more than 6% (Liu). Before any other measures, the preservation of arable land trumps in urgency for agricultural reform. Urbanization rates in China have gone through the roof and led to the loss of farmland (Zhang). A "Permanent Agricultural Zone" policy would guarantee land dedicated to farming and food production. This type of policy fits into initiatives like Ecological Civilization or the 5-Year Plans. China looks to harmonize humans and nature by prioritizing environmental development and protection (Hu). The 14th five-year plan, set between 2021 to 2025 plan lays out goals for green development and urban-rural integration through sustainable agriculture (Bank). The 14th five-year plan is endorsed by the National People's Congress, the legislative body of China (Wei). With cooperation from the National People's Congress, amending similar laws like the Farmland Protection Law should be a start. The Farmland Protection Law fights against the conversion of farmlands for non-agricultural purposes (Xinhua). The National People's Congress would amend this law to clearly define prime agricultural land and establish zoning rules. "The United States Department of Agriculture (USDA) defines prime farmland as the land best suited to food, feed, forage, fiber, and oilseed crops" (Carver). This definition would lay out a good foundation for saving productive land for agricultural purposes. In combination, zoning laws such as prohibiting non-agricultural construction, only allowing land conversion for agricultural purposes or the requirement of sustainable methods. Similar to the U.S.' Department of Agriculture, China would use its Ministry of Agriculture and Rural Affairs to ensure adherence to guidelines and regulations. As for urban-rural integration policies, out of 840 million people living in rural China, 509 million make up farming (Rozelle; Huang). Rural push factors vary from limited access to education or healthcare, job opportunities to wage disparities and more (Hu). Rural areas have limited access to healthcare compared to urban areas (Han). Rural areas also face a disadvantage with education in all aspects (Zhang). Primary healthcare facilities are all-around more accessible in terms of location and little to no expenses (Funk). A plan would be to establish and upgrade primary healthcare centers in rural areas. China's medical device industry is thriving and is one of the best in the world ("A Tour"). Upgrading already existing primary healthcare centers with modern medical devices allows rural facilities to handle illnesses and provide accurate diagnoses.

Establishing more primary healthcare centers with modern medical devices would also be a good addition. Medical schools in China typically direct their students to work in urban healthcare facilities, actively avoiding rural areas (Hou). To make sure these new and improved centers function accordingly with enough medical professionals, policies could encourage partnerships with medical universities to station healthcare students in rural areas, higher salaries or student loan forgiveness for students who dedicate to rural years for a minimum amount of years. The 14th five-year plan also aims to implement rural revitalization strategies (Houkai). Research and development spending for the 14th five-year plan is set to increase by 7% every year for its duration (Cooper). More directly, China has a Rural Vitalization Fund that specifically allocates funds for rural revival and poverty ("PBC"). The central government would have no difficulty allocating some of the research and development funds to finance these policies that would advance their objective of rural revival and poverty. The urban-rural integration policies would generally combat the push factors that rural residents face. This would prevent a larger influx of population growth within cities (Gong). Stronger land protection policies would secure the essential space for farming. Urban-rural integration policies encourage rural economic development, infrastructure improvement and reduce rural depopulation, keeping farmers on arable land. Urban-rural integration policies improve the welfare of rural populations and make farming more attractive as well as resolute.

Another solution is enforcing better farming practices. China poorly uses chemicals with 30% of the world's fertilizers and pesticides (Hannink). The overuse of these chemicals pollutes the natural environment and negatively affects biodiversity (Ritchie). Integrated pest management (IPM) would relieve farmers of their reliance on pesticides. IPM programs scientifically monitor pests and carefully

cultivate control methods that also consider the environmental and health impacts (EPA). IPM encourages farmers to install pest barriers, prevent pests from entering naturally, and engage in more preventative measures (EPA). IPM has careful monitoring of pest populations for farmers to make data-based decisions (*Monitoring Pest*). IPM programs also encourage soil management, a preventative measure to the desertification that China faces. Soil management would conserve soil through the principles of reducing tillage practices, keeping soil health qualities, conserving water sources, and curating a profitable crop rotation plan that also maintains soil health and applies to necessary crop goals (“Agriculture”).

Lastly, farm modernization through advanced methods and technology. One type of modern farming is precision agriculture. This type of modern farming collects and analyzes data to help give farms particular insight and reduces the use of fertilizer, pesticides, and water (Mass Challenge; Yarrington). Precision agriculture may look like tractor guidance with the use of GPS or variable rate technology (“Benefits and Evolution”). The use of GPS and automated machines makes farming more specific and caters to the crops and land. China actively looks to grow into a “Digital China” (Xinhua, “China Unveils”). To implement precision agriculture, providing subsidies, supported by digital development, would incentivize farmers to adopt precision agriculture. 36.1% of the population are farmers in rural areas. 60% of agriculture workers are over the age of 45 (“China’s Agricultural”). The aging of the rural labor force leads to resistance to new technology (Zhang). In addition to subsidies, providing training sessions or workshops through agricultural education centers in rural areas is essential to fully utilize and understand precision farming. Agricultural Specialists would lead the workshops with hands-on activities to prepare farmers for real-world work that would apply to agriculture. The Ministry of Agriculture and Rural Affairs published a National Smart Agriculture Action Plan for 2024-2028 (“China: National Smart Agriculture Action Plan Published”). Farm modernization directly propels the National Smart Agriculture Action Plan of utilizing technology within the agricultural field (Boroughs). The agricultural education centers would also be overseen by the Ministry of Agriculture and Rural Affairs to fulfill the government agency’s duty to manage agricultural policies, rural development, and food security (“Ministry of Agriculture and Rural Affairs”). The agricultural education centers would not only be limited to farmers but would be open to anyone interested. Incorporating modern farming makes farming more attractive to the tech-savvy youth (Machuka).

Conclusion

Agricultural land often gets lost to other government projects but the government recognizes its duty to feed its “largest population” evidently through increasing agricultural products (Textor). Sustainable agriculture would give rural households fewer push factors and attract people to rural communities (“Nurturing the Shoots of China’s Sustainable Agriculture”). Sustainable agriculture directly relates to the decrease of poverty in rural areas (Ye). From the modernization of farming, younger farmers would be more willing to work in agriculture and adopt new practices. As all of these solutions lead to a growing farming workforce and market, it would no longer be looked down upon. Sustainable agriculture would help those in rural areas with less access to good products. As 40% of China’s workforce is in farming, it can help farmers improve their market (Eisenman). “When agricultural operations are sustainably managed, they can preserve and restore critical habitats, help protect watersheds, and improve soil health and water quality” (World Wildlife Fund). All of the solutions presented in this paper reflect a variety of China’s goals for its nation. China can continue to observe increased food security through policies aimed at land protection and urban-rural integration, better farming practices, and modernized farming.

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