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### **Moldova: Europe's Agricultural Diamond in the Rough**

“On average, 4 people leave Moldova every hour in the pursuit for a better job, resulting in 15% of Moldova's population living outside of the country”(Colesnic, 2016). The cause of this diminishing population in Moldova is due to the lack of employment opportunities for the country's citizens. This problem arises from unsustainable agriculture practices, which also result in a degraded environment making the production of crops more challenging. If a focus on one of the poor farming techniques is accomplished, this could lead to increase agricultural yields that in turn spur the economy and alleviate unemployment for Moldova. The introduction to contour banking and reforestation efforts for the country will be the solution towards soil erosion. “Soil erosion is a natural occurrence that depletes the surface of the soil from its nutrients, which can be caused by heavy precipitation and wind,” (Causes of Soil Erosion, n.d.). This eroding topsoil is due to the outdated farming practices that do not prevent soil erosion from happening. Furthermore, the control over soil erosion through sustainable agriculture in Moldova will create stabilization for the country's food security progression and economic successes.

The Republic of Moldova is a country full of unique traditions and lifestyles, which is found in the southeastern portion of Europe. “Moldova became an independent nation on August 27, 1991 from the Soviet Union, and has been improving from that point on,” (Sukhopara, Latham, Buckmaster, & Hitchins, 2017). “The country has a population of 3,474,121 people and its unique culture flourishes in the central southern capital of Chisinau,” (The World Factbook: MOLDOVA., 2017). A large amount of the population has been diminishing since most people in Moldova immigrate to other foreign countries for jobs. “Moldovan immigrants have training and knowledge in the fields of education, business, healthcare, and social services. However, only 12% of immigrants take on jobs that involve their qualifications. These educated citizens take on jobs in personal care services, construction, and household care,” (Invitat, 2013). “Emigrants send their earnings back to Moldova for their relatives to have financial stability. These long span relations create situations where Moldovan children do not see their parents for up to 8 years, and having some living alone with older siblings,” (Mohamed, 2014). Moldova has a distinct family lifestyle, since it is drastically impacted by the lack of development in agriculture sustainability. “There are about three people living per household, and there is usually at least one parent working in a foreign country,”(Liller, 2018). “Families in urban and rural areas have about three to four children, but families in the city have about two children,” (Moldova, n.d.).

A Moldovan family's diet consists of various food groups, but mainly fruits and vegetables. “For breakfast, Moldovans living in urban areas eat light sandwiches with fruit preserves, and have coffee or tea to drink. In more rural areas of the country, people eat porridge, potatoes, bread, and sheep cheese for breakfast. The most amount of food that people eat are meats, breads, vegetables, specifically potatoes. Typical vegetables Moldovans eat on a daily basis are eggplants, cabbages, potatoes, peppers, and

tomatoes. In addition, some fruits eaten are apples, plums, grapes, strawberries, watermelon, and cherries. Chicken and pork are the least expensive meats and therefore are found most prominent in a Moldovan diet,” (Customs, n.d.). “Moldova gives free education starting from the age of 7 to 16, and about  $\frac{2}{3}$  of high school students who graduate go onto study in college,” (Moldova, n.d.). “Everyone has access to the basic free health care, which covers health care for emergency assistance, treatment, and small illnesses. People over the age of five have to pay for medicines, and other procedures that are not considered to be crucial, including dentistry. Also, people must pay for the extra costs in addition to taxation, which pays for only  $\frac{2}{3}$  of the medical costs, and the rest must be paid by the patient,” (Healthcare in Moldova, n.d.). Finally, life in Moldova grants you the basic access to clean water, toilets, electricity, roads, and local markets.

Moldova’s land is crucial for the success of the country’s economy. “The country uses 74.9% of the land for the cultivation of crops, which is the majority of exports for Moldova,” (The World Factbook: MOLDOVA, 2017). “The crops that Moldovans cultivate on their land to export include: wheat, barley, grapes, corn, potatoes, sunflowers, sugar beets, and soybeans,” (Moldova-Agriculture, n.d.). “These crops correlate with Moldova’s list of major exports that consist of textile, machinery, and food products. Most of the country’s imports include: chemicals, textiles, fuel, machinery, and mineral products” (The World Factbook: MOLDOVA, 2017). Additionally, the climate and geography of Moldova give the country potential to be a successful and modern farming country for Europe. “During the winter, the climate is mild and dry, while the summer brings warm temperatures of around 20 degrees celsius,” (Sukhopara, Latham, Buckmaster, & Hitchins, 2017). The geography and geology of Moldova’s land provides the country many advantages towards protection and farming. “The country shares borders with Romania on the west, and with Ukraine on the north, south, and east. The country’s territory is mostly located between two of its rivers; the Nistru and the Prut,” (Fedor, H. & Library Of Congress, 1995). According to Fedor, “geologically, Moldova lies primarily on deep sedimentary rock that gives way to harder crystalline outcroppings only in the north, where higher elevations are found on the margins of the foothills of the Carpathian Mountains,” (Fedor, H. & Library Of Congress, 1995). “Approximately  $\frac{3}{4}$  of the country’s land is covered by a black fertile soil called chernozem soil, which is highly rich in nutrients for crops, but heavy pesticide usage in the Soviet Union, and the unsustainable agricultural practices used in the country have degraded 25%-30% of the quality of the soil,” (Country Profile - Republic of Moldova, n.d.). “These outdated techniques cause about 80% of the country’s land to be affected by soil erosion, resulting in 20 to 25 million tons of its topsoil to be lost every year,” (Country Profile - Republic of Moldova, n.d.). “Next, drastic deforestation in the land resulted in only 11% of the country to be covered by forest, when 200 years ago forests covered 30% of the territory,” (Belarus, Moldova, Ukraine: United by Forests, 2015). “Current efforts by the World Bank are attempting to increase the percentage to 15%, but to restore Moldova back to its original state, reforestation higher than 15% would be better,” (Moldova: More Trees Means More Food, 2013).

The solution I propose to improve the state of Moldova is to replace current unsustainable agricultural practices with the implementation of contour banking along with adding reforestation efforts to end the damage from soil erosion. “Contour banks are channels used to capture runoff from farming fields to

prevent the runoff from causing soil erosion,” (Contour Banks, 2014). “This method is suitable for Moldova since the country’s geography consists of hilly plains, which will make the collection of runoff easier due to the natural slopes” (Infoplease, n.d.). “Contour banks use a slight slope for the runoff to descend from the fields and then it is transported by the channel to a main outlet,” (Contour Banks, 2014). The contour banks on a farm will be able to collect the runoff into one place, where the farmer could potentially filter the runoff for the water to be reused. Contour banking has been found to be a success in South Australia where it is used to prevent soil erosion from occurring. According to Harding, “more than 300,000 hectares of agricultural land in South Australia is protected by contour banks,” (Harding, 2008). “These channels are about 1.2 meters wide and 60 cm high, and the measurements can be adjusted to capture more runoff for larger fields,” (Harding, 2008). To construct a contour bank, soil with the same amount of moisture when seeds are planted is ideal, and road graders are used to create the channels,” (Harding, 2008). These channels are also simple to maintain. “It is only necessary to clean the contour banks every 5 to 6 years, and low or weak spots are able to be patched up with more soil,” (Harding, 2008).

The second part of the solution is to make greater reforestation efforts in Moldova. “There are current efforts in Moldova by the World Bank to increase the total land coverage of trees from 11% to 15% by planting white acacias, which are drought resistant trees,” (More Trees Means More Food, 2013). This current solution is effective due to the fact that it is restoring the country’s forest land, and the roots from the trees will anchor the soil into the ground, and make it less susceptible to moving. “However, this progress will be ending in December 31, 2018, which is the closing date, and I believe the State Forestry Agency should renew the project to continue the efforts until Moldova reaches its original state of 30% forest coverage” (Soil Conservation Follow Up Project, 2006). Financial issues could arise as the previous project costed \$5.28 million, and it is not certain if the World Bank would want to continue to designate that amount for Moldova’s reforestation. “A solution to continue the reforestation is for Moldova to giving state funding to support its own environmental group called Plantam Fapte Bune, who is pushing reforestation efforts in the country,” (Bunting, 2017). Therefore, the country would be independent from organizations that provide these services, and would be able to continue freely.

In order for these goals to be accomplished, the Moldovan people need to become aware of the needs of the country. I believe the Ministry of Agriculture needs to send out notices to farmers or write out a formal statement on their website about the idea of contour banking. “In addition, the Ministry of Agriculture would be able to help finance the construction of contour banks for farms with the funding given through ENPARD Moldova, which was a total of EUR 64 million given by the European Union,” (*The European Union supports the modernisation of the agriculture sector and the development of rural areas in Moldova*, 2014). Additionally, the government could consider joining the European Union since the country has had good relations with the organization. “The organization would be able to provide farmers with direct payments through paying agencies under the European Agricultural Guarantee Fund to help support farmer incomes and developments,” (Funding opportunities under the Common Agricultural Policy, 2017). By applying for these funds through the Ministry of Agriculture, farmers would be able to receive financial aid to cover the costs of contour banking.

To strengthen the efforts of reforestation in the country, the State Forestry Agency and Plantam Fapte Bune, should collaborate together to spread awareness of the importance of reforestation. “Plantam Fapte Bune has strong support from people in Moldova, and a social media presence,” (Bunting, 2017). “The group often organizes planting sessions, and it was reported that one had 125 volunteers show up,” (Bunting, 2017). However, this organization lacks the supplies and the financial support needed, which the State Forestry Agency has. With the financial support, more planting sessions can occur, and more people would become more aware attending the sessions in their towns. It is also possible that these volunteers can become workers for the State Forestry Agency to create more jobs for the nation, and it would make the progression of reforestation more consistent. The State Forestry Agency needs to implement laws as well to secure the work of the organization. Laws and regulations could be implemented as to how often and where trees may be cut down in the country as well as marking the areas where the sessions took place as protected property.

With the proposed solutions, I believe the citizens of Moldova will find positive progress towards a successful future for the country. Reforestation and contour banking will be able to increase crop yield, which will increase the sales and profits in the nation’s exports. With the increase in yield, consumer prices will decrease making necessities more affordable in city areas. In addition, the various selection of food products will benefit the population’s diet, and overall health status of population. The effects of the solution will also decrease emigration due to there will be more job opportunities needed for reforestation, construction and maintenance of contour banks, education for sustainable practices, and agriculture, due to the increase in crop yield. Thus, the surplus of job opportunities will causes more of the working force to stay in their homeland, leading to an increase in population, creating even more jobs to sustain the population.

To conclude, the Republic of Moldova contains a great source of potential to become a successful farming country. The following years of improvement in its overall state will bring greater opportunities, and lessons to teach other countries. Soil erosion is a dominating force that is stopping Moldova from achieving advancements in their plant farming, which has a multitude of simple solutions that can be taken to fix this situation. Contour banking is an ideal solution for Moldova since it corresponds well to the geography of the country, and is simple to implement. In addition, food security in the world is serious matter that cannot be taken lightly. If the Republic of Moldova would make just a slight adjustment to their farming practice, this would bring greater stability to their economy and to their food sources, which will increase the country’s food stability. Small steps in the right direction, like in the case of Moldova, will create a ripple effect to some day entirely dissolve the food security crisis.

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