Journal of Environmental Protection, 2024, 15, 76-93
https://www.scirp.org/journal/jep
ISSN Online: 2152-2219
ISSN Print: 2152-2197

Social and Economic Considerations for Creating Sustainable Climate Change Haven Communities

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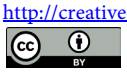
How to cite this paper: Hirschman, E.C., Bourgin, W., Castilla, A., Glover, C., Justice, C., Munoz, M., Thompson, B., Snider, J. and Toomer, O. (2024) Social and Economic Considerations for Creating Sustainable Climate Change Haven Communities. *Journal of Environmental Protection*, **15**, 76-93.
https://doi.org/10.4236/jep.2024.151006

Received: December 8, 2023
Accepted: January 28, 2024
Published: January 31, 2024



Abstract

As Climate Change Haven Communities are constructed across the Northern Hemisphere, it will be necessary to attract two types of migrants to populate them. The first group consists of professionals and companies in eco-sustainable businesses, such as law firms, insurance companies, investment firms, banking, technological innovation, mass media, medical research and pharmaceutical research. The second group will consist of persons engaged in organic/eco-sustainable agriculture whose crops and animal husbandry practices can be transferred successfully to Climate Change Haven regions. The present research focuses on the social and economic variables that must be taken into account to insure that each new Climate Change Haven Community becomes successfully integrated with the local population and forms a cohesive, harmonious social structure. Examples are given from the United States, France, Spain, Portugal and Italy.

Keywords

Climate Change Haven Community, Sustainability, Organic/Eco Farming, Internal Migration, Social Integration

1. Introduction

Despite urgent warnings from the United Nations and multiple governmental agencies, the global climate continues to deteriorate at a rapid rate [1] [2]. The need to re-locate persons from climate-endangered regions of the planet to safer areas is now at a critical level [2]. Yet few countries have prepared plans for assisting their endangered citizens to re-locate or provided new communities in

safer areas of the country to which they can move [2]. The present research addresses both sides of this life-or-death equation by examining the social and economic factors necessary to successfully transfer residents within countries. This same model may also be used to provide safe havens for the millions of persons who are becoming endangered by climate change but must cross national borders to find safety. However, the challenges in this second set of circumstances are much more formidable, due to boundary-crossing and immigration issues [3].

Examples are provided for internal migration in the United States and for the Mediterranean-bordering countries of France, Portugal, Spain and Italy. While we do not explicitly address the problem of cross-border migration, it is believed that the ideas presented here can serve as a guide for this type of migration as well. Cross-border migration (*i.e.*, from one country to another) will be required if the lives of persons living in severely endangered regions of the globe (e.g., the Middle East, Northern Africa, South Asia) are to be saved [2].

Prior research on the creation of Climate Change Haven Communities—communities created to serve as climate-safe locales for migrating persons [3] [4] [5]—has outlined the requirements for eco-sustainable forms of electrical power, housing, transportation, business parks, medical facilities, education and administrative services. See **Figure 1** below.

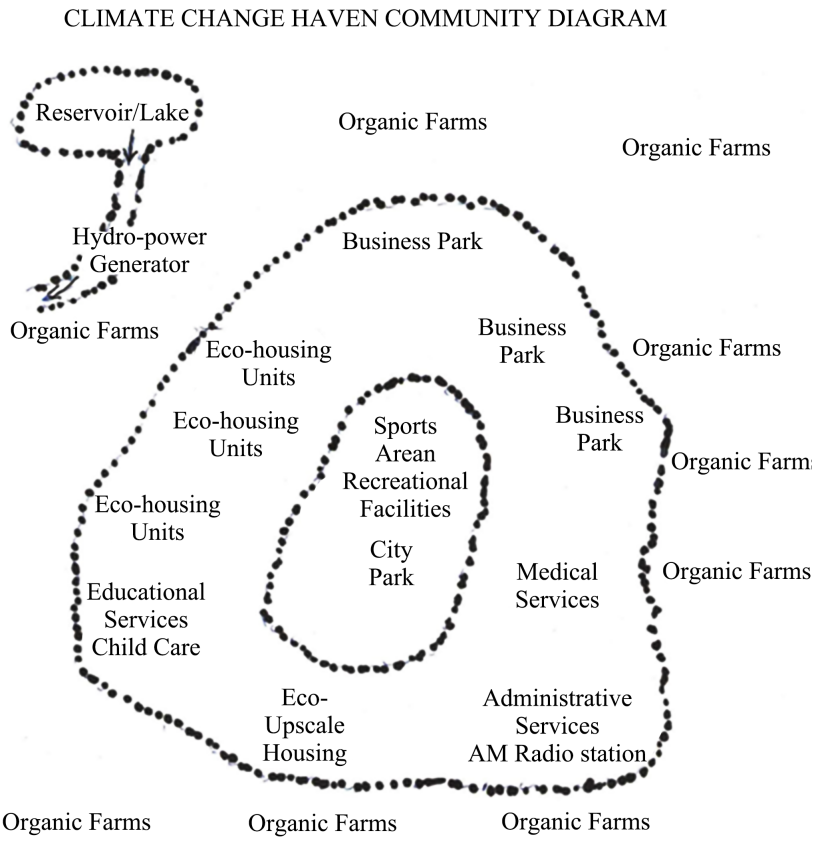


Figure 1. Climate change haven community diagram.

2. Climate Change Haven Community

As shown in Figure 1 above, Climate Change Haven Communities designed for Appalachia in the United States will have 20,000 to 30,000 residents living in a walkable community whose primary power source is a hydro-power generator placed on a nearby lake, river or reservoir. The communit will be surrounded by eco-sustainable farms which will produce the majority of foodstuffs required for the local population. This will greatly reduce the need for long-haul trucking to bring groceries to the community.

The community itself will have a circulating, low cost electric bus service, multiple unit eco-housing for most inhabitants, several business parks where eco-sustainable companies will be located, a medical services building, an administrative services building equipped with a local AM emergency radio communication system, and a section with facilities for schools (grades 1 through high school), kindergarten and child care. The center of the community will be devoted to a sports arena, recreational facilities, and a community park. Shopping, dining and entertainment facilities will be located around the central area so that all residents will have easy access. A separate area is set aside for upscale eco-housing which may be desired by some of the affluent residents. This model should be appropriate for a variety of countries which desire to construct Climate Change Haven Communities.

In the present research, we focus on identifying the specific types of companies and agricultural producers that can be appropriately re-located to Climate Change Haven communities in the United States, France, Spain, Portugal and Italy. Each of these countries has regions which will soon become uninhabitable for humans [2]. Yet these countries also have large land areas which will be relatively unscathed by climate change. In the United States, the Appalachian Region is the largest land area available for Climate Change Haven Communities [3] [4] [5]. In France, Portugal and Spain, the northern and eastern regions encompassing the Pyrenees Mountains can provide safe havens for their internal climate migrants. Similarly, while southern Italy, Sardinia and Sicily will be harshly damaged by climate change, the northern region of Tuscany will be appropriate for Climate Change Haven communities.

3. Identifying Appropriate Companies for Relocation to Climate Change Havens

What companies, services and businesses are appropriate for Climate Change Haven Communities?

The primary candidates are those which produce little to no carbon-based emissions and/or greenhouse gases creating their work-product[1]. The chart in Figure 2 shows the top sources of environmental pollutants by industry. The primary source is the carbon-based energy sector which uses coal, petroleum and natural gas to produce electricity. Climate Change Haven Communities will

[1]EcoExperts, (2023) www.theecoexperts.co.uk/blog/top-7-most-polluting-industries.

utilize only non-carbon based energy sources to supply electricity, for example, hydro-power, solar, wind [3] [4] [5]. Transportation vehicles which utilize petroleum-based fuels (e.g., cars, trucks, buses, trains) will not be permitted in Climate Change Haven Communities and companies which manufacture these petroleum-fueled transport modes will not be admitted. Similarly, manufacturing and construction businesses which produce greenhouse gas emissions will not be permitted to relocate in Climate Change Haven Communities.

As **Figure 2** also shows, another major source of climate change pollution is the Agriculture sector. As will be discussed in a later section on Organic/Eco Agriculture, the current "factory farming" and "industrial agriculture" methods now in widespread use in the United States and Western Europe will not be permitted in Climate Change Haven Communities. Instead, Climate Change Haven Communities will rely primarily on locally-sourced organic foodstuffs, as shown in the Community Diagram in **Figure 1**. This will additionally help reduce the reliance on national chain store food retailing (e.g., Krogers) which requires lengthy petroleum-powered transport of food products to individual stores, as shown in **Figure 2**.

Fashion and Technology businesses could be admitted to Climate Change Haven Communities, if they are able to alter their production methods to eliminate or greatly reduce greenhouse gas emissions.

The total US greenhouse gas emissions in 2021 were equivalent to 6340 metric tons of CO_2. The distribution is shown in **Figure 3**. Note also as shown in **Figure 4** that the level of greenhouse gas emissions from commercial and residential buildings increases substantially when emissions from their electricity end-use are included, due to the relatively large amount of electricity required for heating, ventilation, air conditioning; lighting; and appliances. If emissions from electricity use are allocated to the industrial end-use sector, industrial activities would also account for a much larger share of U.S. greenhouse gas emissions. Climate Change Haven Communities will utilize only non-polluting sources of energy production: primarily hydro-power, wind and solar [6].

Position	Industry	Annual GHG emissions (billions of tonnes)
1	Energy	15.83
2	Transport	8.43
3	Manufacturing & Construction	6.3
4	Agriculture	5.79
5	Food Retail	3.1
6	Fashion	2.1
7	Technology	1.02

Figure 2. Total U.S. greenhouse gas emissions by economic sector in 2021.

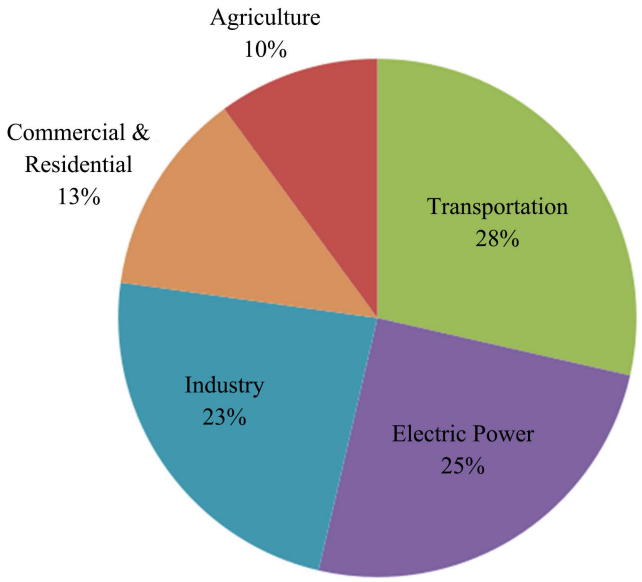


Figure 3. Total U.S. greenhouse gas emissions by economic sector.

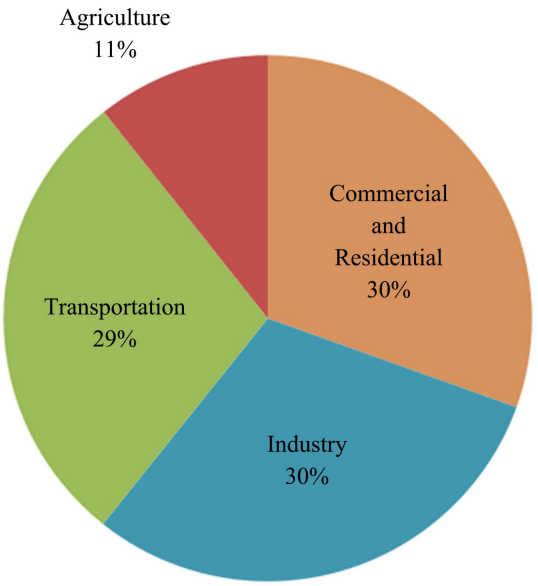


Figure 4. Total U.S. greenhouse gas emissions by economic sector and electricity end-use.

Using the criteria outlined above, we identified companies in eight climate-endangered states in the US whose executives and employees would be invited to move to Climate Change Haven Communities in Appalachia; these states are Arizona, New Mexico, Texas, Louisiana, Mississippi, Alabama, Georgia, and South Carolina. We further limited the companies to moving 5000 or fewer employees per Climate Change Haven Community, because each community is limited to 30,000 or fewer persons in order to maintain sustainable environmental conditions. It is desirable that mix of occupations be present in each location in order to create diverse, well-balanced communities. The companies identified as desirable for re-location are:

State:	Company name:	Business
Arizona	PetSmart	Pet Supplies
	Banner Health	Health Services
	Republic Services	Trash Recycling
	Amkor Technology	Technology
	ON semiconductor	Technology
New Mexico	Sunbridge Healthcare	Health Services
	Citizens Bank	Financial Services
	KHI LLC	Assisted Living
Texas	Dell Technologies	Technology
	Texas Instruments	Technology
	USAA Insurance	Insurance
	Abbott Laboratories	Pharmaceuticals
	Charles Schwab Corp.	Investment Services
	Fidelity Investments	Investment Services
Louisiana	Century Link	Communications
	Morgan and Company	Marketing
	Delta Electronics	Electronics
	The Shaw Group	Pipe and Module Fabrication
Mississippi	The Yates Company	Construction
	Bankcorp South	Banking
Alabama	Alfa Electronics	Electronics
	Nou Systems	Technology
	Qualitest Pharmaceuticals	Pharmaceuticals
Georgia	Home Depot	Consumer Home Projects
	UPS	Delivery Services
	General Electric Energy	Energy Systems
	Bell South Communications	Communication Systems
	NCR Technology	Technology
South Carolina	Commonwealth Financial	Consumer Finance
	Pure Fishing	Sporting Goods
	Lexicode	Computer Systems
	Interloop Limited	Technology

We also focused attention on the Mediterranean Region, as most of the countries bordering the Mediterranean Sea will experience severe climate change damage to their eco-systems in the next few years. Companies meeting these same criteria in France, Spain, Portugal and Italy are listed below. Their executives and employees would be invited to move to Climate Change Haven Communities in their respective countries. These companies are as follows.

4. France/Spain/Portugal

These three countries are grouped together because their primary Climate Change Haven Communities will be located in the Pyrenees Mountain Range.

Company	Name Business
Kalray	Technology
Parrot	Technology
Arkea	Banking, Investment
Pharnext, Bial, Hovione	Pharmaceuticals
Critical Software, Farfetch,	Technology
OutSystems	Technology
MAIF, Fidelidade	Insurance

The primary locale for Climate Change Haven Communities in Italy will be the northern regions and Tuscany, as will be discussed below.

ITALY

Company	Name Business
Barilla	Sustainable Food
Lavassa	Sustainable Coffee
Ferrero	Sustainable Food
Benetton	Sustainable Fashion
Campari	Sustainable Beverages
Snam	Sustainable Energy
Parmalat	Sustainable Dairy Products

5. Identifying Appropriate Agricultural Producers for Relocation to Climate Change Havens

The next task is to identify sustainable agriculturalists currently operating in the endangered regions of the United States and the four Southeastern European countries and invite them to move their farms to the arable regions surrounding each Climate Change Haven Community. By doing so, the energy requirements for transporting foodstuffs to the CCH communities will be greatly reduced, the food will be much fresher, and any community members (especially children and retirees) who desire will be able to participate voluntarily in the food production process by helping plant, cultivate and harvest crops, as well as tending livestock.

Industrial Agriculture

Currently, agricultural production in the United States is characterized by what is termed "industrial agriculture" and "factory farming" [7] [8] [9]. As depicted in **Figure 5** and **Figure 6** below, industrial agriculture is dependent upon highly mechanized systems of production, requiring not only heavy, petroleum-powered machinery to plant and harvest the crops, but also copious quantities of chemical fertilizers, herbicides and pesticides to grow the crops [9]. Because crops are not rotated, natural soil nutrients are rapidly depleted which leads to erosion during wind and rain storms [9]. Additionally, large amounts of fresh water are required to irrigate the fields which then run off into nearby lakes and rivers carrying with it the chemicals used to produce the crop [9].

Figure 5. Industrial agriculture harvesting in the United States.

Figure 6. Industrial agriculture depends upon a variety of pesticides, herbicides and fertilizers.

Factory Farming

A companion practice to industrial agriculture is "factory farming"; this essentially requires meat animals to be housed in enclosed buildings, fed rapid growth formula ingredients, and then butchered as soon as they reach marketa-

ble size [7]. This practice is not only inhumane, but requires the use of chemically-enhanced fast-growth feeds, antibiotics to reduce illness due to close confinement, and a narrowed number of breeds within each species [7]. The narrowing of animal breeds being used in factory meat production has reduced the options available not only to consumers, but also led to reliance on a set of farm animals genetically susceptible to disease [9]. This raises the potential of catastrophic stock loss in the incidence of new disease mutations [9]. **Figure 7** and **Figure 8** below depict current factory farming practices.

Figure 7. Factory farms rely on close confinement, chemical feed additives and a limited number of meat-producing species for national supermarket chains.

Figure 8. Factory farms are used to produce large quantities of homogeneous meats for supermarkets.

Promoting Sustainable Agriculture in Climate Change Haven Communities

In the United States eco-sustainable agriculturalists residing in climate-endangered states will be invited to move their operations to Climate Change Haven Communities in Appalachia and provided with low-cost farmland. The current producers meeting eco-sustainable agriculture criteria in each climate-endangered state are listed below:

Arizona

Blue Sky Organic Farm
Laveen Brothers Land and Cattle
Cooper Ranch
Maya's Farm
Duncan Family Farm

New Mexico

Owl Creek Farm
Los Poblanos
East Mountain Organic Farms.
One Straw Farm
Synergia Ranch
New Mexico Harvest Marketplace.

Texas

Good Earth Organic Farm
Green Gate Farm
The 1915 Farm
Emadi Acres Farm
Buck Creek Meats
Eat Your Greens Farm
Farmshare Austin

Louisiana

Eat Wild Farm
Fullness Farm
Credo Farms
Willow Creek Ranch
Starkey Farmstead

Mississippi

Weesner Meadow Farm
Nature's Gourmet Farm
Pearl River Blueberry Farm

Alabama

Heritage Hills Farm
Bois d'Arc Farm
Mountain Sun Farm
Foggy Bottom Farms
Mountain Sun Farm

Georgia

White Oak Pastures
Heritage Organic Farm
Jenny Jack Farm
Rise 'n Shine Farm

South Carolina

Whippoorwill Farms
Watsonia Farms
Humble Acres Organics
Blue Sunny Day Organic Farm

6. Southwestern Europe

We turn now to discussion of the current practice of factory farming and industrial agriculture in the four countries in Southwestern Europe which will require Climate Change Haven communities: France, Spain, Portugal, and Italy.

France

France has long been revered for its brilliance with food (www.french-waterways.com/20-iconic-french-menu). Unfortunately the past few decades have seen French farmers turn increasingly to the practices of industrial agriculture and factory farming in an effort to supply inexpensive food to supermarket chains [10]-[15].

By introducing Climate Change Haven Communities surrounded by organic and sustainable farms in the northern and Pyrenees regions of France, it will be possible to return to the original excellence of French cuisine and provide a much healthier diet for all inhabitants [16]. The map below in **Figure 9** shows the areas where Climate Change Haven Communities and organic/sustainable farms should be located; these are primarily in the Pyrenees and northern portions of the country.

A list of organic/sustainable agriculturalists is given below:

- U Porcu Ranger
- Ferme d'Agerria
- Les Noveris du Landers
- Ferme St. Marthe
- Domaine de Marquilliani
- Les Jardins de la Grelinette

Spain and Portugal

Spain also has recently embraced factory farming and industrial agriculture in an effort to bring lower cost foods to consumers ([17] [18] [19] [20]. However, the impact of these practices on the Spanish environment has been very negative [17] [18] [21]. Indeed, the deteriorating conditions on the Iberian Peninsula are affecting the entire Mediterranean basin region [22] [23]. Temperatures are forecast to climb to above 110 Fahrenheit on a regular basis [2]. When this occurs, the only habitable regions for Spain's residents will be the northern areas in the Pyrenees Mountains. **Figure 10** below shows the anticipated impact of climate change on Spain and Portugal by 2035.

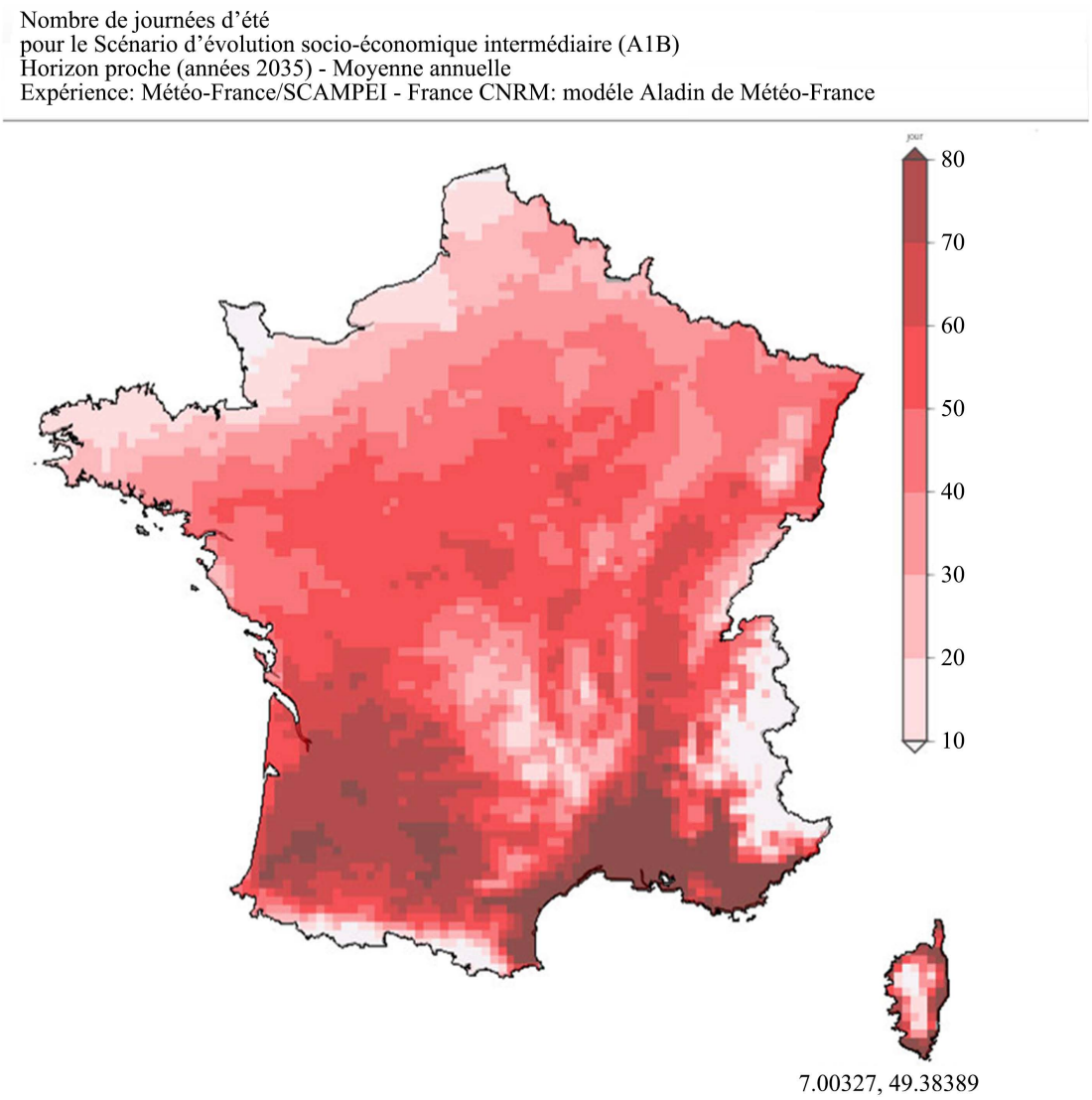


Figure 9. Climate change forecast map for France 2035.

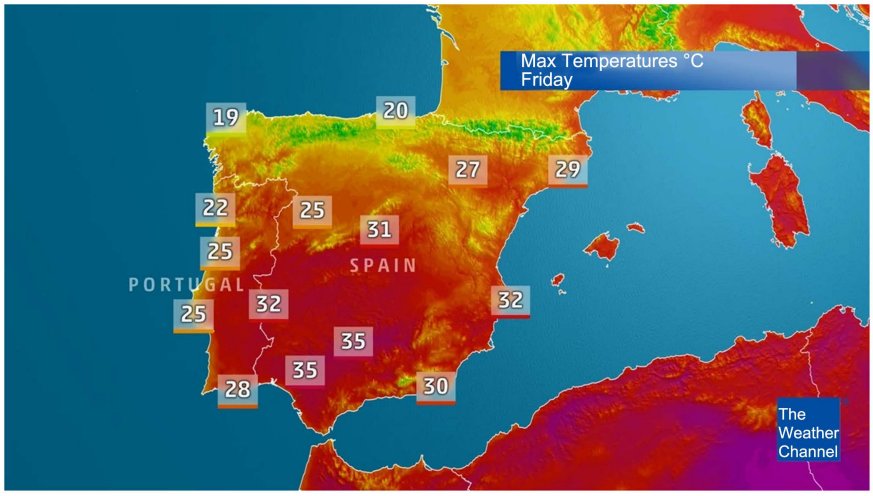


Figure 10. Predicted climate change impact on Iberian Peninsula.

Portugal still produces the majority of its foodstuffs from family-owned farms [24], but its location on the lower coastal area of the Iberian Peninsula places it at great risk of climate degradation over the next decade ([25] and see **Figure 10** below). A good strategy for both Spain and Portugal, therefore, would be to move much of the Portuguese farming population to the Spanish Pyrenees Region. The total population of Portugal is around 10,250,000 persons; whereas Spain's population is around 47,500,000; thus this population movement would likely not cause issues of overcrowding. Unless the Portuguese move northward to higher, cooler regions, they will face difficult survival odds. A listing of sustainable agriculturalists in both countries is given below.

Organic/Sustainable Farms in Spain (S) and Portugal (P)

Agroponiente Group (S)
Fuertes Group (S)
Agro Sevilla (S)
Dcoop (S)
Verdifresh (S)
Herdade dos Grous (P)
Quinta do Vale da Lama (P)
Herdade do Freixo (P)

Italy

As with France and Spain discussed above, Italian food production has increasingly moved toward both industrial agriculture and factory farms [11] [24] [26] [27] [28] [29]. Their usage is now found from north to south along the Italian Peninsula [13] [30]. These practices have led to increased air and water pollution, as well as contributing to climbing temperatures along the entire Italian peninsula, especially the southernmost portions, including the islands of Sardinia and Sicily. However, as **Figure 11** below shows, the northern-most sections of Italy and along the upper eastern coast, the anticipated rise in temperature will be moderate, permitting organic/sustainable farming to be greatly expanded there.

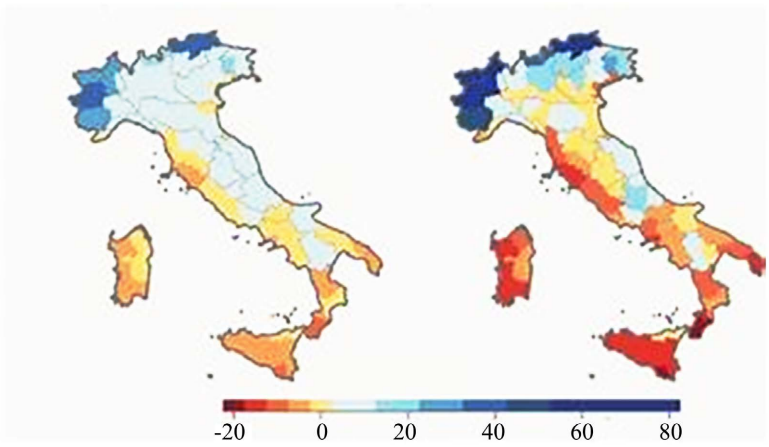


Figure 11. Climate change will make the western coast of Italy and the islands of Sardinia and Sicily unfit for farming.

There are already several organic/sustainable agricultural efforts in Italy, which are listed below. The farms in the endangered areas should be moved to the northern regions of the country within the next three to five years.

Italy

Casa Clelia

Moscatello Muliner

Ca'de Memi

Villa di Campolungo

Podere La Casellina Figline

Val di Boccio

7. Combining Three Populations to Create a Harmonious Community

The Climate Change Haven Community activities outlined above will bring together three cultures of people. First are the current residents now living in the region where the new communities will be built. These persons have their own lifestyles and values which must be acknowledged and respected by the new arrivals who will consist of business and services professionals and eco-agricultural workers. An earlier article, Hirschman and Toomer [5] presented a series of local media and community engagement outreach programs to inform local residents of the benefits to be gained by locating Climate Change Haven Communities in their Appalachian Region.

Among these benefits are the improved employment opportunities created by the arriving companies, a much larger tax base to support public services, more specialized and improved medical services, an enlarged and upgraded public education system, low cost public transportation, and low cost electrical power generated by hydro-power generators. This last feature offers the potential for the community to sell excess power to neighboring states.

It is essential that the local population surrounding each community be supportive of its construction and committed to making the project a success. Similar outreach programs will be necessary for the resident populations now living in the Climate Change Haven Regions of France, Spain, Portugal and Italy.

There will be two types of new residents arriving in the Climate Change Haven Communities. The first is the professional/business group. These new residents will likely all be college educated, often with advanced degrees in their field of expertise, e.g., law, medicine, banking, pharmaceutical research [31] [32] [33]. Sociological studies indicate that persons in this social class tend to be open-minded, flexible, creative and willing to consider multiple perspectives ([31] [33]. This mindset should be very useful for helping them adapt to their new surroundings—especially since many will be from large cities with hotter, dryer climates (e.g., Phoenix, Arizona; Dallas, Texas; Atlanta, Georgia) than they will find in their new community.

Their new community will be surrounded by rolling hills and/or forested mountains. Rainfall will be more frequent; the winter months will be cooler. But

once they have adjusted to the new climate, they will find it much more healthful for themselves and their families. To better enable these potential residents to prepare for this climatic and geographic transition, it would be desirable to bring groups from each company being relocated to visit the construction site, ask questions, and make suggestions about features that would make them feel more "at home".

The other group moving to the Climate Change Haven Community will be composed largely of eco-farm families and any additional workers they use for their agricultural activities. We anticipate these new residents will be very pleased with their re-location. Here they will likely find richer soil, ample rainfall, cleaner air, and open terrain that will better support their crops and livestock than their current farm location. Additionally, they will be moving into what is essentially a farming/homesteading culture. Appalachia, the French/Spanish Pyrenees Mountains, Northeastern France, and Northern Italy are today—and have been for centuries—farming regions with a culture that values independence, self-sufficiency and neighborly assistance [31]. To further support this transition, we recommend bringing potential migrating farmers to the Climate Change Haven Region well in advance of their move to help them select the acreage most appropriate for their crops and/or livestock. It would also be very useful during these visits to introduce them to local farmers in order establish a support and knowledge network prior to their arrival.

8. Concluding Comments

In the present research we have presented a plan to identify two groups of people—professionals working in eco-sustainable businesses and farmers engaged in organic/sustainable agriculture—who are presently located in climate-endangered areas of their country. These persons will be contacted and provided assistance to move to Climate Change Haven Community locations within their home countries. The study has focused upon these two occupational groups in four countries: the United States, France, Spain, Portugal and Italy. We believe the relocation process described in the study can be extended to other countries across the globe which have locations that are climate-threatened, but also have areas which can become Climate Change Havens for their citizens, for example, China and India.

However, our study has left unaddressed the larger global issue of persons living in countries such as Morocco, Algeria, Sudan, Somalia, Pakistan, Bangladesh, Chad, and Niger which have no locale in which their people will be safe. Unless the residents of these endangered countries are moved to safer locations by 2035, it is likely that most will perish from lack of food, water and/or hyperthermia. Sparsely populated regions of the Northern Hemisphere, e.g., Norway, Sweden, Scotland, Greenland, Canada, Finland, Estonia, Latvia, and Lithuania will soon have arable land available in what is presently tundra. They would likely be able to support large-scale migrant communities, if they are willing to

take-in persons from these endangered countries. Since most of the entering migrants will be agriculturalists, it is possible that their current skills and knowledge will be transferable to these new Northern locations. Research is urgently needed to assess the transferability of various crops and livestock types to these soon-to-be-available regions.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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