

# INTERDISCIPLINARY APPROACHES TO SURVIVING THE **ZOMBIE APOCALYPSE**

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## Interdisciplinary approaches to surviving the Zombie Apocalypse Conference

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### **GUERRILLA GARDENING: RECOVERING AFTER THE ZOMBIE APOCALYPSE**

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# GUERRILLA GARDENING:

## RECOVERING AFTER THE ZOMBIE APOCALYPSE

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### ABSTRACT

This paper examines three central pillars dealing with survival of the zombie apocalypse. First, the paper looks at how survivors can work together in a mutually beneficial manner to create a community in urban environments. The second pillar examines how individuals and communities will interact through the creation of culinary currency. This includes systems of trade and exchange. Finally, the paper examines the importance of cooperation and trust between individuals and groups in order to survive.

**Keywords:** *Cooperation and Trust, Urban gardening, Community Building, Food Security, Culinary Currency, Resilience*

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### 1. INTRODUCTION

The worst is now over, only a small amount of zombies remain along with pockets of humans who managed to survive the attack. The big question on the mind of those who have survived is what now? What are we supposed to do next? This paper will answer these questions by examining how survivors could regroup and rebuild through farming or gardening communities. The ways in which surviving groups can band together and take advantage of their surroundings and create stable sources of food will be addressed. Gardening or stable agricultural production date back to antiquity as the basis for community creation and growth. Likewise, after the zombie apocalypse the creation of urban gardens will facilitate the future growth of communities and the human population alike.

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This paper will employ a resilience lens to understanding food security during the zombie apocalypse by examining urban gardening. Barthel et al. (2013) evince the importance of urban gardens during societal collapses and crisis historically illustrating how gardens serve the basis of transmitting ecological knowledge or memories to secure food production during these periods. Resilience is defined as the ability to overcome shocks through adaptation, learning and innovation whilst utilizing and reorganizing resources to ensure fundamental societal functions are not lost (Folke, 2006, p. 259; Barthel, 2014, p. 428). Resilience as a concept or analytic frame is extremely robust as it may be applied fruitfully to multiple fields of study, from homeostasis to community life (Zautra et al., 2010, p. 224).

The robust methodological nature of resilience is important because it enables multilevel analysis capabilities which are applicable to individuals and communities (Zautra et al., 2010, p. 224). The concept of resilience is particularly useful as it serves the purpose of explicating the link between food security and survival in urban environments (Barthel, 2014, p. 429; Chan et al., 2015; Barthel et al., 2013; Okvat & Zautra 2011). The importance of urban gardening as a element within resilience is not limited to one scenario or context but it is applicable to various scenarios. For example, urban gardens have been essential ‘supportive institutions’ and coping mechanisms during times of economic, social and environmental crisis (Chan et al., 2015, p. 626).

The paper will focus on three main areas which are as follows. First, the paper will examine the importance of community building. From time immemorial humans have gathered in communities which have served multiple purposes including security and psychological needs. Second, the paper will examine the ways in which post-apocalyptic communities will form economic ties with each other and other surviving communities. This section will be called culinary currency and will examine the various materials which will establish and propagate communities through the creation of instruments of currency, monetary norms and systems of exchange. The third part of the paper examines the development of cooperation and trust amongst and between communities and individuals.

## 2. COMMUNITY BUILDING

Herein the paper will examine the importance of community building after the zombie apocalypse. After the majority of zombies have been dispatched it is likely the pockets of surviving individuals and small communities will begin to emerge from their strongholds. The basis of this emergence will most likely be to find other survivors and to secure resources required for survival. The majority of transportation systems will likely not be functional or operational at this point. Thus, the majority of travel will be done on and through existing infrastructure such as highways and railways. The importance of this is that these systems i.e., major highways and railways all ultimately link rural communities with major urban centres or cities. As a result, by using these established transportation systems survivors in rural environments can seek other survivors in major urban centres by following these systems.

This section will examine how urban gardens serve as the basis for individual survivors developing positive social ties whilst laying the metaphoric seeds for a future community. One way community gardening aids in building and fostering social interaction between individuals is through facilitating a sense of community (Ohmer et al., 2009, p. 398). Moreover, Veen et al. (2016) conclude that urban community gardens contributed to the development of social cohesion between different individuals. A sense of cohesion between survivors would serve as the basis for individuals coming together to form a community. Firth et al. (2011) expounds the beneficial impact community gardens have on individuals and community building through promoting education and propagating gardening skills. Within these budding communities survivors can bolster their sense of community through exchanging and learning various skills used to survive including how to garden.

There are also positive psychological benefits to gardening which can help individual survivors overcome experiences of trauma whilst interacting with other survivors. Urban gardening has been shown to be a vital element of resistance and resilience during times of crisis, offering surviving individuals positive psychological therapeutic benefits (Tidball et al., 2010, p. 592; Tidball & Krasny, 2009, p. 153). Due to the psychological benefits of gardening it is well situated within a resilience frame of analysis. Groups and communities of humans have created gardens as positive psychological responses to trauma during some of the direst situations in human history. For example, during WWI soldiers in the trenches

planted gardens and during WWII Jews in the Warsaw ghettos planted gardens along with Japanese Americans within internment camps (Tidball et al., 2010, p. 591). In each of these cases the cultivation of the harvest was never guaranteed, further emphasizing gardening's positive psychological element (Tidball et al., 2010, p. 591). Furthermore, gardening saved millions of lives during the two great wars through food production ensuring stable food supplies (Barthel & Isendahl, 2013). In short, gardening has historically been inseparable from survival and wellbeing of individuals and communities during times of crisis and war.

It is important at this point to illustrate examples of how gardening has ensured community and individual survival during times of crisis and war. At the onset of the Second World War Britain produced less than one third of the food the nation required to survive (Ginn, 2012, p. 296). As a result, the government emphasized that the war could be won or lost due to the supply of food, this dire situation even led Lord Woolton to proclaim 'this is a food war' (Ginn, 2012, p. 296). Urban gardening during the two great world wars became a vital component to victory. During WWI the campaign was called the Everyman's a gardener (Barthel, 2014, p. 434; Barthel et al., 2010, 263) whilst during WWII these war time efforts were known as the Dig for Victory campaign (Barthel, 2014, p. 436). It was at the conclusion of WWI that the term Victory Garden originated describing the gardening efforts on the home front of citizens (Miller, 2003, p. 396). Victory Gardens were household gardens used to help support the war effort; these systems were so successful that in 1944 20 million home gardeners managed to produce 40% of the nation's fresh vegetables (Brown & Jameton, 2000, p. 22).

During the zombie apocalypse survivors would have to rely on stable food supplies they could cultivate for themselves as they would not have access to any imported produce. In addition, food at the grocery stores would either spoil in time or be taken and consumed. The great wars and the zombie apocalypse are similar with respect to emphasizing the importance of food security. Both cases illustrate how local food production is quintessential for survival. The historical examples provide numerous insights for survival and are not merely idiosyncratic but in fact provide vital insights into food security. The first link is that ultimately all of the examples deal with survival or resilience during times of tribulation. The second link is that without food security, through stable local production, survival or resilience over time is impossible.

The war time examples parallel the zombie apocalypse because in both cases stable food sources are disrupted and mass starvation is a serious threat. The zombie apocalypse

would certainly be characterized as a protracted conflict and therefore any historical lessons predicated upon previously experienced protracted conflicts and food security are useful. Survivors cannot eat their weapons and therefore they must, like the English, during the World Wars establish and secure stable local food supplies. It may be argued that the campaigns during the two World Wars are not that salient of an example as many in society still had knowledge of how to grow their own food. However, the British took the opposite view whilst designing these abovementioned programs viewing the populace as uneducated and inexperienced gardeners who would struggle without decisive support (Ginn, 2012, p. 298).

The historical examples adduced herein illustrated the link between survival, food security, and community formation through gardening. This includes the positive psychological elements of gardening which acts as a form of resilience. The historical examples of survivors in internment camps and during the trench warfare further linked the importance of gardening to psychological resilience. It is important to provide actual historical examples as they solidify these arguments with real world experiences which have worked during times of crisis. Ultimately, any examination of the zombie apocalypse which simply focuses on defensive measures such as barriers and the procurement of weapons will ultimately prove to be myopic in a survivalist context. The acuity in this ratiocination is exemplified through another practical historical example of medieval warfare with castles and fortresses. For example, even if the defenders castle or fortress proved to be impregnable many times defenders were starved into submission during a protracted conflict. This example is analogous to the zombie apocalypse because individuals may have excellent physical security and weapons during the zombie attacks but if they are surrounded and cannot produce food they will ultimately lose.

### **3. CULINARY Currency**

Hereunder the paper will examine various materials and objects which will become the central economic elements of the newly formed communities after the apocalypse. Specifically, this section will focus on the creation of monetary systems and exchange systems resulting from organized communities in urban environments. The first section will example how organic and non-organic materials and goods will become the monetary pillars upon which urban communities will be formed. They will not only serve to sustain the nutritional requirements of the community but will also provide the basis for creating culinary currency.

It is these instruments of commerce which are required to trade and barter between individuals within the community and between communities. The development of these instruments of culinary currency will be solidified with historical examples in which food and products have been used as instruments of currency. Furthermore, the paper will examine how markets and system of exchange can develop around these forms of currency resulting in entrepreneurial gardens.

The second section will examine the importance of knowledge, memory and skills within the context of creating culinary currency. Each member of the community will possess their own unique ability, memory or knowledge which can be used to aid the community. It is these individuals' skills and knowledge which will serve as the basis for creating the abovementioned entrepreneurial gardens. Moreover, these skillsets employed toward the creation of food and material goods will serve as the basis for trade between communities which have formed. With time these initial systems will become formalized and will result in the creation of bartering systems that have standardization methods for trade between communities. Standardization of goods being exchanged along with caravans, who exchanged between cities or communities, dates back to antiquity in Babylon which codified these interactions (Johns, 1904). It is likely that this form of trade and exchange will once again find forms of equilibrium after the zombie apocalypse.

The section herein on the development of culinary currency will do well to consult the work of Adam Smith with respect to the creation of wealth with money. In Smith's seminal work *The Wealth of Nations* it is noted how wealth, or money, was measured in various ways and through different items or products. For example, at one point a common instrument of commerce was cattle whilst in India species of shells were used and another is dried cod used in Newfoundland (Smith, 1986, p. 127). The dried cod example adduced by Smith is rather important to the culinary currency context as it clearly espouses a historical example in which food becomes an instrument of currency. These historical examples in the creation and use of money illustrates that almost any item or good can be employed as a means to exchange products and goods. Another example Smith provides is in Scotland where nails are used to obtain products at the bakers shop or the ale house (Smith, 1986, p. 127).

This example illustrates how gardening tools such as spades or wheel barrels for example can become instruments of commerce within the culinary currency context. In a similar fashion during the zombie apocalypse superfluity of certain products or produce can be exchanged and traded for other goods. Moreover, Smith illustrated how wealth is an

ephemeral concept as an item or good only possesses a value which is dictated by the price someone else is willing to pay for it at a given time (Beinhocker, 2006, p. 4). In other words, the price of an apple, for example, during the summer may not be as expensive as it would be during the winter. Knowledge of gardening techniques and crop cultivation could also become an instrument of commerce as it can be traded or exchanged for material goods such as produce, tools and seeds. The importance of knowledge as an instrument of commerce will be further examined hereunder.

Gardens have historically been inexorably linked with the generation and production of commerce. From a historical context, the use of urban gardens to alleviate poverty and food shortages can be traced back to the period of the Industrial Revolution in England (Hanna & Oh, 2000, p. 209). In the United States, urban gardening endeavours can be traced to the depression of 1893 where the mayor of Detroit, Hazen Pingree, employed vacant land to be transformed into food production sites (Hanna & Oh, 2000, p. 209). In a similar manner survivors in the Detroit area can once again use the empty plots of land to cultivate crops.

Furthermore, urban gardens have various economic impacts and implications beyond the production of produce. Hancock (2001, p. 279) presents the argument that gardens provide the fertile economic soil for the creation and cultivation of various forms of capital which include: human, economic, and social. For example, human capital is developed through learning how to garden, social capital is developed through cohesive social networks, and economic capital is developed through surplus and exchange systems (Hancock, 2012, p. 279). In supplement, Hake (2017, p. 34) concludes that urban gardens are the location from which vital knowledge and skills are transmitted, shared and acquired in addition to generating community engagement. Therefore, it may be argued that gardens can serve as the basis from which the future economy and communities will develop after the zombie apocalypse.

One of the ways in which the future economy will develop out of urban gardens could be through the creation of entrepreneurial gardens. Brown and Jameton (2000, p. 21) consider two essential elements within urban agriculture systems which are as follows: community gardens and entrepreneurial gardens. These two types of gardens will be essential in the creation of new communities and stable exchange systems. First, community gardens represent small individual systems of crop production delineated by individual households or individuals (Brown & Jameton, 2000, p. 21). This can include roof top gardens or gardens on small plots of land in the urban environment which were once used for flowers



or other aesthetic purposes. The second form of urban agriculture is entrepreneurial gardens which include the cultivation of various herbs, seeds, flowers and animals which can be raised for the purposes of trade and survival (Brown & Jameton, 2000, p. 21). The creation of entrepreneurial gardens is essential to creating systems of trade and ensuring survival as communities could produce and trade goods other communities cannot due to limitations such as climate.

Moreover, individual gardens can develop into entrepreneurial gardeners who sell and exchange their surplus food in community farmers markets (Ferris et al., 2001, p. 563). Cuba during the post-Soviet era could provide a very important historical case to illustrate local gardening resilience and responses to food shortages. This includes gardeners developing exchange systems, such as free markets, during food shortages. When the Soviet Union collapsed in 1989 Cuba's food supplies from imports disappeared requiring drastic and creative measures to ensure the people avoided mass starvation (Endres & Endres, 2009, p. 420). One of the key responses was the creation of farmer's markets which developed into a free market system stimulating food production and a stable exchange system (Endres & Endres, 2009, p. 423). Another important feature is that gardeners began to sell their produce at prices established by the free market and were also able to compete with other higher priced markets (Endres & Endres, 2009, p. 423). This example illustrates that when food systems are disrupted individual gardeners can come together and create free market systems predicated upon the exchange of surplus produce. This is certainly a form of economic and ecological based resilience. Part of the title of the conference is survival and without a stable supply of food and economically functioning exchange systems survival and resilience will be even more difficult.

One of the most important elements of culinary currency is acknowledging the fact that without the knowledge and skills required for gardening all the tools and seeds are of little value. Hence knowledge and skills of how to put those tools to use are some of the most important forms of currency or human capital. The skills and knowledge required to successfully produce food is disappearing rapidly in modern cities. One of the reasons why knowledge is diminishing in modern urban settings is due to a process known as space-time compression. Space-time compression is defined as the socio-economical process that reduces the importance of geographical distance (Barthel, 2014, p. 442; Barthel et al., 2013, p. 2). As a result, many local food sources are seen as irrelevant leading to the loss of knowledge required for local food production (Barthel et al., 2013, p. 2). In other words, due to changes

in lifestyles and values in modern urban cities the knowledge of gardening is quickly evaporating (Barthel, 2014, p. 442).

An important element of resilience is memory during times of tribulation as it serves the purpose of informing decisions (Barthel, 2014, p. 429). In the context of this paper the ability to remember or have a memory of how to plant and cultivate food locally act as a key factor of resilience to ensure survival. The reason why memory of how to garden is so crucial is that as a society we are losing this knowledge. It has led some to argue that city dwellers are suffering from generational amnesia calling it the ‘extinction-of-experience’ (Barthel, 2014, p. 429; Miller, 2005). Furthermore, this profound loss of knowledge and skills required to produce food has led some to argue we are under a ‘global generational amnesia’ (Barthel & Isendahl, 2013). This generational amnesia has made those who possess the aforesaid culinary knowledge of inestimable value during a crisis. These individuals are also called ‘memory workers’ serving as beacons of information transmission aiding in understanding local ecosystems such as climate fluctuations, soil types and plant cultivation (Barthel & Isendahl, 2013).

Moreover, these stewards of ecological knowledge play a vital role in food security acting as an element of resilience through possessing and transmitting vital information during times of crisis (Barthel et al., 2013, p. 6). Barthel and his associates argue that collective mnemonic devices play a vital role in social-ecological memory. Social ecological memory can be defined as the ways in which knowledge and practical skills about argo-ecosystems is secured and transmitted over time (Barthel, 2014, p. 438). These mnemonic devices include habits such as imitation of gardening practices, oral traditions which provide the transfer of vital information and physical artifacts such as tools (Barthel et al., 2013, p. 7). In the past the elders of a culture were known as the stewards of ecological knowledge who ensured crops were planted and harvested at appropriate times (Barthel, 2014, p. 437; Barthel et al., 2010, p. 256). From the perspective of community building these elders can be the vital conduits required to successfully mentor and transmit vital knowledge ensuring the growth and success of the future community (Krasny & Tidball, 2009, p. 13). This form of knowledge stewardship is directly linked with enhancing resilience in post-catastrophe environments through gardening (Tidball et al., 2010, 604). The aforementioned memory workers whom possess mnemonic devices such as the tools, habits and traditions required to secure and propagate social-ecological memory act as pillars of resilience. These skills and

devices can be shared freely within a community or traded between communities for monetary advantage as instruments of commerce within the context of culinary currency.

#### **4. COOPERATION and Trust**

This section will examine the importance of trust and cooperation and the application of these concepts during the zombie apocalypse. Cooperation and trust in a world with no governmental oversight or authority to enforce rules and laws would according to some be impossible. However, this section will examine various examples that contradict this notion and illustrate the ability of humanity to cooperate and trust even during times of war. The ability to trust and cooperate without governmental oversight illustrates an aspect of resilient harmonious social relations exemplifying humanities virtues. The development of trust is an important aspect of resilience as it enables social-ecological systems to respond and acclimate to change (Folke, 2006, p. 261). This links with the materials examined herein as small clusters of cooperative and trusting individuals can unite around the creation of urban gardens. These small clusters of cooperative and trusting gardeners may be the basis for recreating society in a productive and mutually beneficial manner.

A salient example will be drawn from World War I trench warfare that illustrates the ability of humanity to cooperate and trust under circumstances which are not auspicious. Axelrod (2006, p. 74) adduces an excellent example of cooperation and trust during times of war with what was called the “live and let live” policy between soldiers. During World War I commanders were reporting seeing soldiers watching each other within rifle range and not killing each other (Axelrod, 2006, p. 21). In effect choosing to acknowledge the opposition’s humanity and practicing trust within killing range. This example is important because it was not isolated to one case but was systemic (Axelrod, 2006, p. 74). Moreover, what is of note is that the environment in which this developed was a kill or be killed environment, yet humanity was able to show a side of cooperation and trust not normally associated with war. Therefore, even after having to fight to survive and potentially not being able to initially trust people during the zombie apocalypse the potential for trust and cooperation to develop is ever-present. This example speaks to the ability of surviving individuals and groups to learn to trust each other and be able to cooperate and work together in order to form functional communities.

This section will examine the work of Axelrod (2006) on Cooperation Theory and how it is applicable to the zombie apocalypse. Underpinning the Cooperation Theory is an examination of individuals who seek their own self-interest without central authority to force cooperation (Axelrod, 2006, p. 6). This basis is very applicable to the zombie apocalypse scenario for two central reasons. First, social order would collapse and so would any form of centralized authority and secondly, individuals would act in a self-interested manner in such an environment. One of the most salient conclusions drawn from the Cooperation Theory is that cooperation and trust can begin with only a small cluster of individuals in an environment where others will not cooperate (Axelrod, 2006, p. 173).

The most applicable aspects of Axelrod's (2006) work on Cooperation Theory to the zombie apocalypse are his four pieces of practical advice which will be examined herein. Axelrod (2006, p. 110) provides four practical pieces of advice that resulted from his research and those are: don't be envious; don't be the first to defect; reciprocate both cooperation and defection; don't be too clever. The first piece of advice Axelrod (2006, p. 110) elucidates is not to be envious, life and social interactions are not zero-sum games. In short, not every interaction requires one actor to lose whilst the other wins. In a similar fashion, not every interaction after the zombie apocalypse will be a zero-sum game. For example, survivors can exchange or trade surpluses in food between each other leaving both in a better position, one having excess tomatoes willing to trade another with excess potatoes.

The second piece of advice Axelrod (2006, p. 113) provides is not to be the first to defect or not cooperate. The key finding within Cooperation Theory is that it pays to cooperate (Axelrod, 2006, p. 113) so don't be the first to not cooperate. Defection represents being the first party to not cooperate. This advice is applicable to the zombie apocalypse because it would pay to have a stable cooperative relationship with other individual survivors. This could take the form of exchanging surplus foods; whilst stealing represents defection or non-cooperation in this scenario. Axelrod (2006, p. 114) also found that populations using the 'nice' or cooperative stratagem can resist invasion of mutant rules based on non-cooperation. Within the zombie apocalypse context this means that if a group is exchanging food and a new individual enters and continually defects or steals the others will protect themselves by not cooperating with them.

The third piece of advice Axelrod (2006, p. 118) espouses is to reciprocate both cooperation and defection: "practice reciprocity." This stratagem was known as Tit for Tat, what is important to note about this strategy is that its first move was always to cooperate

(Axelrod, 2006, p. 118). This is a very valuable lesson for the zombie apocalypse as it illustrates that the first interaction with individuals should be to cooperate setting the stage for future cooperation. Another interesting finding was the development of a Tit for Two Tats stratagem which chooses to cooperate twice before practicing reciprocity which makes it a forgiving rule avoiding recrimination (Axelrod, 2006, p. 119). This forgiving stratagem could be a very salient element during the zombie apocalypse because it could lead to future cooperation even if the first interaction was defection. For example, one could steal food or defect even though they wished to cooperate but only defected to protect them-selves because they have not encountered other cooperative survivors. With the act of forgiveness the initially defecting individual or survivor could change their behaviour and start to cooperate and trade food equitably.

The fourth piece of advice Axelrod (2006, p. 120) offers is not to be too clever. What is of further interest and correlates with the previous piece of advice is that complex maximizing rules negated the fact that their behaviour could change the behaviour of the other player (Axelrod, 2006, p. 121). As a result it is important to use a simple strategy which is clear so the other player can understand what you are doing, therefore leading to cooperation (Axelrod, 2006, p. 123). The lesson to the zombie apocalypse survivor is to approach each interaction with a simple plan of cooperation by making your intentions clear to other survivors so they will be able to predict your future behaviour. Moreover, one survivor's choice to simply cooperate can have an impact on the behaviour of another survivor as the work of Axelrod illustrated one's behaviour or choice can influence another's in a positive way through forgiveness.

This section highlighted that cooperation and trust are essential elements to human interaction and through these concepts humanity distinguishes itself. This section also illustrated the fact that there is room for optimism and trust within scenarios which are less than favorable for human interaction. One would be hard pressed to find a better example than the trench warfare example to illustrate humanities ability to cooperate and trust in a kill or be killed situations. This section also provided vital information about how trust and cooperation could develop even in situations without authority whilst those acting are motivated by self-interest. The key take away point here is that survivors must begin each interaction with cooperation and trust. As noted herein the behaviour of one player can change the behaviour of another. Therefore, if we practice cooperation through trust adding an element of forgiveness, or tit-for-two-tats, we can lay the foundation for creating

communities of cooperation and trust. It should also not be forgotten that if one encounters Machiavellian survivors one should respond with reciprocity if met with continual defection, therefore, enacting an element of individual and community resilience.

## 5. CONCLUSION

Each of the sections highlighted essential elements which are pertinent to the survival of humanity after the zombie apocalypse. The first section dealing with community building focused on how groups of survivors can come together in mutually beneficial social structures. This parallels historical precedents where the first communities and groups in antiquity came together as a result of stable agricultural systems through gardening and farming. The section on community building also illustrated the link between gardening and facilitating a sense of community. Furthermore, it illustrated the importance of knowledge and memory with respect to creating functioning gardens. It was essential to highlight how as a society we have become inept at self-sufficient food production and this factor would limit the potential for survival. Those who possessed the vital knowledge required to produce food would become central pillars in the formation of new communities.

Gardens were also shown to be essential to psychological resilience during times of crisis and war. The historical examples established the links between the resilience frame of analysis and crisis. The historical examples also illustrated that during times of crisis survival is inexorably linked with food production and food security through gardening. The two great World Wars provide a vital link between how individuals can come together through gardening communities in urban areas during crisis. The example of warfare during the mediaeval castle period further illustrated the link between war, survival and stable food supplies. Liken to the zombie apocalypse impenetrable defenses and unlimited munitions will prove useless if a stable food supply is not secured.

The second section examined how pockets of communities would begin to monetize materials and goods associated with farming and agriculture. It also highlighted the fact that at the early stages those materials and resources which will be the most valuable are those which are required for food production and cultivation. Culinary currency represented a form of economic resilience because even though there was a collapse in the monetary system a new one can emerge. The work of Adam Smith illustrated how there are historical examples of food, animals and tools being traded and exchanged as instruments of commerce. These historical forms of currency provide functional examples of how monetary systems are a fluid

concept which can adjust to various scenarios. Another salient element of economic resilience espoused within the culinary currency is the creation of entrepreneurial gardens. These gardens represent a form of economic or market resilience through the exchange of surplus produce predicated upon free market principles.

The final section examined the concepts of trust and cooperation. These two concepts are easily overlooked in an apocalyptic scenario; however, they are in fact the most important of all the factors examined as they permeate community building and economic exchange systems. The focus of this section was to examine in an optimistic manner the potential for humanity to act in ways that seems counterintuitive. The paper also examined the practical pieces of advice Axelrod provided with their application or importance to the zombie apocalypse. Cooperation and trust represent a form of social resilience allowing interactions between survivors to return to normal interactions. This section illustrated how trust and cooperation could develop individually and in groups overcoming any Machiavellian survivors through reciprocity when faced with continual defection.

The work of Axelrod illustrated a vital component of developing trust and cooperation and that is we should begin each interaction with an act of cooperation. This initial action sets the tone for other survivors to respond in a like manner. However, the most salient piece of advice applicable to the zombie apocalypse derives from the tit-for-two tats model which incorporated an element of forgiveness. This element of forgiveness could be the basis for creating trust and cooperation with survivors who expect others to steal from them and therefore would not initially cooperate themselves. These survivors could then respond with trust and cooperation after interacting with other survivors who are forgiving and willing to cooperate and trust.

Ultimately this paper focused on the zombie apocalypse in an optimistic manner illustrating through the use of historical examples and the analytic frame of resilience how humanity can and has overcome crisis in positive ways. In conclusion, we ought to take heed from the story of Pandora from the works of Hesiod. Once the jar was opened and the innumerable evils were beset upon humanity in the end, Hope remained (Evelyn-White, 1970, 95ff). It is this hope that we ought to foster and cultivate in order to overcome, survive and thrive after the zombie apocalypse!

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