

Late Blight: Pioneering the Science of Agricultural Extension

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SUMMARY

The potato, introduced to Ireland in the late 16th and early 17th centuries, rapidly became a staple due to its economic and nutritional advantages. However, the heavy reliance on mono crop and its lack of genetic diversity led to disaster, Irish Famine. This catastrophe, which halved Ireland's population through death and emigration, also spurred the birth of modern agricultural extension services. The great hunger caused by Irish famine underscores the importance of adaptive agricultural practices and the transformative impact of agricultural education and extension.

INTRODUCTION

Ireland's relationship with the potato began in the late 16th and early 17th centuries, likely introduced by the English or Spanish settlers. In Ireland, the widespread cultivation of potatoes was driven by economic factors, including taxes on above-ground crops like grain and livestock. Potatoes grew underground and were not as heavily taxed, making them attractive to farmers looking to minimize their tax burden. One such notable tax was the "tithe" system, where farmers were required to pay a portion of their produce, typically in the form of grain, as a tax to the Church of Ireland. This tax was particularly burdensome for poor farmers who struggled to produce enough surplus grain after subsistence farming to meet the tithe requirements. Other reasons include, nutritional richness, high productivity, adaptability to various soil types, and suitability for small-scale farming in Ireland's cool and damp climate, potatoes planted their name forever in Ireland. Its ability to produce high yields even on poor soils provided a critical advantage in a predominantly agrarian society. The potato quickly gained widespread acceptance among the Irish people, leading to its rapid cultivation. The potato's underground growth and economic advantages attracted impoverished landless laborers in Ireland. These laborers rented small plots from landowners primarily focused on cattle or grain production for the market. A single acre of potatoes and the milk from a cow could provide enough nutrition to sustain an entire Irish family, despite their poverty. Many families grew extra potatoes to feed pigs, which they could sell for additional income. By the end of the 18th century, the potato had become integral to the Irish diet. However, the lack of genetic diversity among potato varieties and continuous monocropping left the crop vulnerable to late blight, ultimately leading to the devastating Irish Famine.

Irish famine (Late blight): The Shadow of Death

In 1845, Ireland experienced a sudden drop in temperatures to as low as 1.5 - 7 degrees Fahrenheit, coinciding with the emergence of a devastating new disease known as Late Blight of potato (*Phytophthora infestans*). This pathogen caused widespread decay and rotting of potato plants, resulting in complete crop failures not only in Ireland but also across various parts of Europe. The catastrophic impact led to the deaths of approximately 1.5 million people and prompted 2-3 million others to emigrate to different parts of the west. Between 1845-1860s, Ireland's population plummeted from 8 million to 4 million, leaving an indelible scar on Ireland's history.

Irish Famine: Genesis of Modern Agricultural Extension

The Irish Famine became very severe by 1847 and no one knows the exact reason behind. Despite of famine the farmers continued to grow potato as they know only potato cultivation, but the results are same. This crisis-driven innovation gives the birth of modern agricultural extension services and has revolutionized agricultural practices worldwide, demonstrating the power of education and outreach in farming communities. The Irish famine became a turning point and taught a lesson that political factors and reliance on a single crop

exacerbated the disaster, leading to widespread famine and suffering. In response, British Viceroy Earl Clarendon, appointed in 1847, sought solutions to prevent future agricultural crises.

Clarendon wrote to the president of the Royal Agricultural Improvement Society in Dublin, requesting the appointment of “itinerant lecturers”. These lecturers were to travel across rural Ireland, educating small farmers on how to grow alternative, nutritious root crops. This initiative marked the inception of modern agricultural extension services - systematic efforts to extend agricultural knowledge and innovations from research institutions to rural communities.

Itinerant Lecturers: A New Approach

The itinerant lecturers, funded by landowners, charitable donations, and government-controlled funds, played a critical role in disseminating agricultural knowledge. They demonstrated practical farming techniques, provided advice on crop diversification, and introduced farmers to new agricultural practices. This hands-on, localized approach proved highly effective in addressing the immediate crisis and building resilience among farmers.

Extension Spread: Across Europe

The success of the itinerant lecturer system in Ireland quickly attracted attention from other European countries. German officials organized their own system of traveling instructors, known as “Wanderlehrer”. These instructors, supported by state funds, offered free advice and education to farmers, spending summers traveling and winters teaching at agricultural schools.

Württemberg – Considered employing itinerant farm advisers (Wanderlehrer) influenced by the Irish model.

Crisis among Vine Growers – After 10 years, the system in Württemberg grew rapidly, influenced in part by the crisis among vine growers resulting from the devastations caused by “phylloxera aphid” infestation.

Wanderlehrer Duties – Wanderlehrer spent the summer half of the year traveling around their districts giving talks, demonstrations, and advice to farmers. For the remaining part of the year, they taught farmers sons at winter agricultural schools.

The model soon spread to Denmark in 1870, followed by the Netherlands, Italy, Switzerland, and Russia. In France, the first national, wholly state-funded agricultural extension service was established in 1879. Before this, a few itinerant agriculturalists served only a small fraction of the country. The Minister of Public Instruction in 1874 recommended expanding this system, leading to the appointment of additional itinerant agricultural teachers and the passing of a law in 1879 that formalized their roles. By 1880, these Professors were state-appointed civil servants tasked with educating farmers and trainee primary school teachers.

Across United States

The United States embraced the concept of agricultural extension through a series of legislative acts. The Morrill Act of 1862, signed by President Abraham Lincoln, established land-grant colleges aimed at disseminating agricultural knowledge.

Key Provisions of the Morrill Acts

Morrill Act of 1862

- Allocated 30,000 acres of federal land to each state for each senator and representative in Congress.
- The land was to be sold, and proceeds used to establish and fund colleges focused on agriculture and the mechanical arts.
- The act fostered a partnership between the federal government and the states in promoting education, research, and extension services related to agriculture and the mechanical arts.

Morrill Act of 1890

- Required states to show that race was not an admissions criterion or to designate a separate land-grant institution for people of colour.
- Provided additional funding to these institutions, supporting historically black colleges and universities (HBCUs).
- Morrill act was followed by the Hatch Act of 1887, which supported experimental work at these colleges. By the end of the 19th century, agricultural extension had become a well-established system in the U.S.

Key Provisions of the Hatch act of 1887

The primary purpose of the Hatch Act was to advance agricultural research. It aimed to support scientific experimentation and research to improve agricultural practices, enhance productivity, and address agricultural challenges.

The Hatch Act provided federal funds to land-grant colleges established under the Morrill Act of 1862. These funds were designated specifically for agricultural experiment stations associated with these colleges. The act mandated the establishment of agricultural experiment stations in connection with land-grant colleges. These stations were tasked with conducting research and experiments in various agricultural domains. The findings from agricultural research were disseminated to farmers and the public through extension services, improving agricultural practices across the country.

The Smith-Lever Act of 1914 further institutionalized agricultural extension by establishing the Cooperative Extension Service and creating a vital link between land-grant universities and the public. By providing federal funding and fostering a partnership with state and local governments, the act ensured that valuable agricultural and home economics knowledge reached farmers and rural communities. The Cooperative Extension Service has played a significant role in improving agricultural productivity, promoting rural development, and enhancing the overall quality of life for rural Americans.

Global Expansion and Evolution

The concept of agricultural extension continued to spread globally. In Australia, dairy schools were established, while Japan introduced national and prefectural level itinerant agricultural lecturers by 1885. Government experimental stations and demonstration farms followed, with a system compelling farmer to adopt technical guidance.

Extension in India

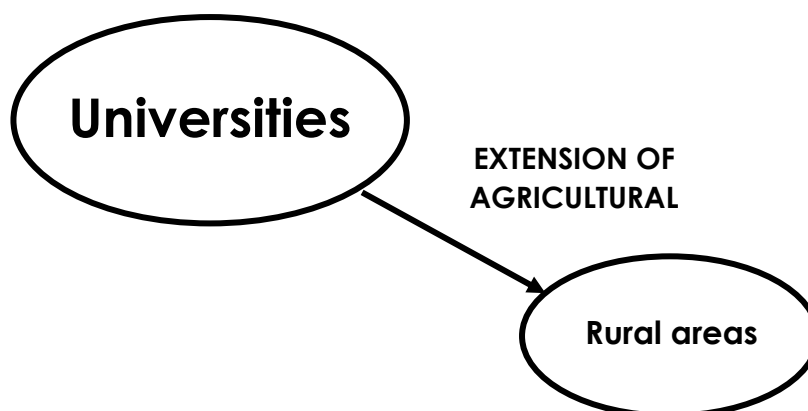
Colonial Period – Agricultural extension activities during the British colonial period were limited but included some efforts to introduce modern agricultural techniques.

Post-Independence – After independence in 1947, India established the Indian Council of Agricultural Research (ICAR) and various state agricultural universities to focus on agricultural extension and research.

Green Revolution – During the 1960s and 1970s, extension services played a crucial role in disseminating high-yielding varieties of crops and modern agricultural practices, leading to the Green Revolution.

The True Meaning of Agricultural Extension

By the time of the Irish famine, the concept now known as “extension” was not yet named. It wasn’t until 1866 that the term “extension” was coined, with the introduction of the University Extension system by Cambridge and Oxford Universities. The word “extension” comes from the Latin roots “ex”, meaning “out”, and “tensio”, meaning “stretching”. This reflects the idea of "stretching out" or expanding the reach of university



knowledge to rural areas. In the context of agriculture, “extension” has a specific and transformative meaning. It represents the process of disseminating knowledge and innovations from academic institutions to farmers and rural communities. This transfer of expertise is crucial for boosting crop yields, promoting sustainable farming practices, and ensuring food security.

CONCLUSION

The Irish Famine, despite its devastating consequences, served as a catalyst for the development of modern agricultural extension services. The innovative response to the crisis in Ireland laid the foundation for a global movement to improve agricultural practices through education and outreach. Today, agricultural extension services continue to empower farmers with knowledge and resources, enhancing food security and agricultural productivity worldwide. The legacy of the Irish Famine endures in the ongoing efforts to support and sustain farmers. By sharing knowledge and innovative practices, agricultural extension services honour their origins and continue to play a vital role in promoting agricultural development and resilience.

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