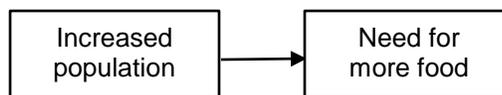


7: System Change

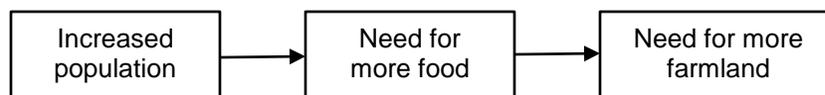
Investigation: Flowcharting Change

Societies and their cultures are systems, and in systems, **everything** relates to **everything**. If a new drug increases average lifespans, the society must change to account for more elderly people. If improvements reduce the cost of air travel, more people travel by air, affecting airports and roadside gas stations.

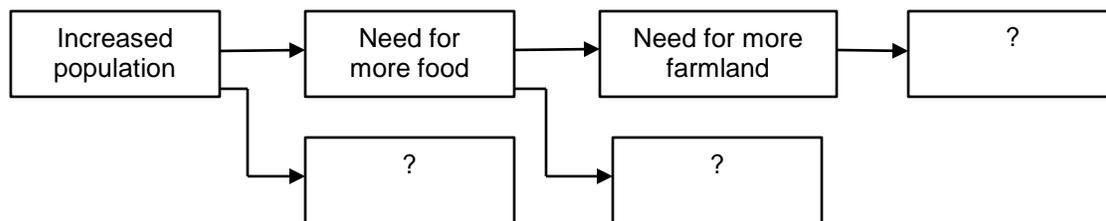
Tracing changes in systems can be complicated, so it's important to organize information. One rather simple approach is through the use of flowcharts—diagrams showing possible cause-effect relationships. A flowchart begins by identifying a change in one part of a system, and then asks, “What would logically follow as a consequence of that change?”



Each new change usually becomes a cause of more changes:



And so on. Each change can have more than one effect.



In your journal, copy the diagram above, and fill in additional changes that would fit logically in the “question marked” boxes.

The data below describe changes that have affected several societies in important ways. A flowchart at the end shows some of the changes. ***Read the account, then complete the investigation by working on the summarizing flowchart.***

Fifty to seventy years ago, in Detroit and a few other cities, a young high school graduate could go to work at a local auto plant. He (almost always this was a male) would be taught how to do one particular job on an assembly line, then do that job for months or years. It would be boring, but wages and benefits were good. He would be making enough, in three or four years, to support a wife and family.

The job might change a little when a new model came out, and he might eventually move to a higher-skilled position as he gained experience, but he'd likely continue, working alongside thousands of other workers doing similar jobs.

<https://media.ford.com/content/fordmedia/fna/us/en/features/celebrating-the-moving-assembly-line-in-pictures.html> (This and next photo)



Auto assembly at Ford factory, Windsor, Ontario, Canada, 1956.

In relatively few years, production procedures changed in major ways. Writer and columnist Thomas L. Friedman, writing about an experience in 1992:¹

“I was in Tokyo on a reporting assignment and had arranged to visit the Lexus luxury car factory outside Toyota City, south of Tokyo. It was one of the most memorable tours I’ve ever taken. At that time, the factory was producing 300 Lexus sedans every day, made by 66 human beings and 310 robots. From what I could tell, the human beings were there mostly for quality control. Only a few of them were actually screwing in bolts or soldering parts together. The robots were doing all the work. There were even robotic trucks that hauled materials around and could sense when a human being was in their path and would “beep, beep, beep” at them to move.”

Ford Fiesta assembly line in Germany. Most autos worldwide are assembled like this now.

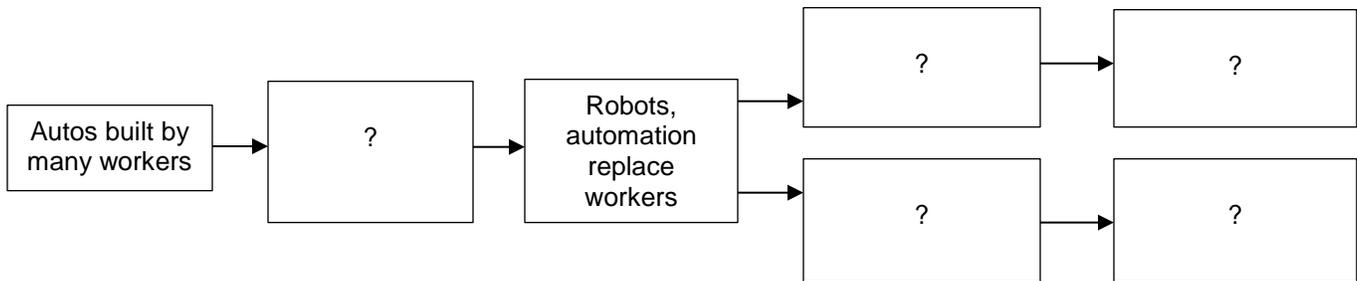


¹ Thomas L. Friedman, *The Lexus and the Olive Tree*, New York, 2000, Anchor Books Div. of Random House; p. 30.

High unemployment in factory communities eventually led to deterioration in housing, city services, and schools, along with other problems.

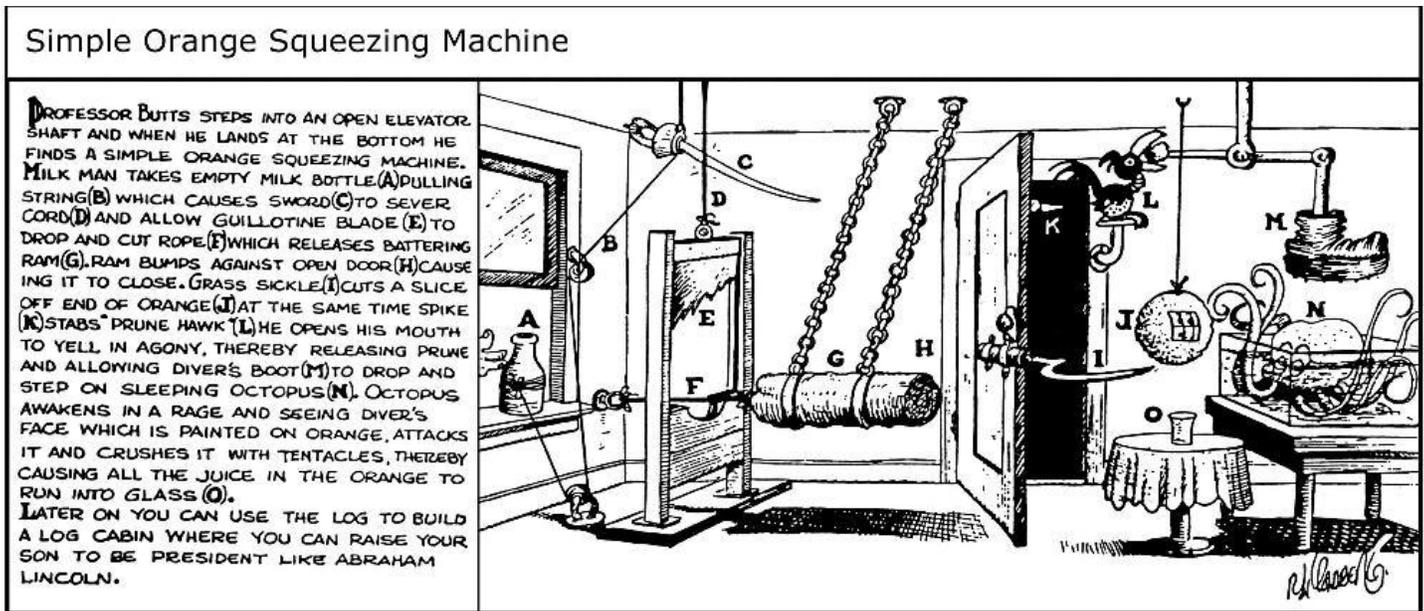
The system for assembling cars changed, causing other changes.

Copy the flowchart below, and fill in the blanks, showing causes and effects. You may wish to change the diagram, with fewer or more blocks, or arrange them differently. Make sure every arrow shows a true relationship.



What's happened in auto production has happened in most manufacturing industries. Robots assemble TVs and toasters. Machines mix, process and bag fertilizer or cake mix. Computers replace law books and the expert legal knowledge needed to use them.

Below: <https://hbr.org/2014/01/dont-let-regulation-make-your-business-a-rube-goldberg-machine>



Ireland

The island of Ireland is just west of Great Britain, in the northeast Atlantic Ocean. Northern Ireland is part of the United Kingdom (with England, Scotland and Wales); the rest of the island is an independent country, part of the European Union.

The climate is mild but damp, with surprisingly warm winters for its northern latitude. Summers are long but cool, and rain is frequent year round. The center of the island is a plain; ponds and bogs, hills and low mountains cover much of it. The coasts are rocky.

Ireland is a bit smaller than the state of Maine in the U.S.; the population is about 6.4 million, with about 1.8 million living in Northern Ireland.



<http://www.lonelyplanet.com/maps/europe/ireland/>

In the past 40 years or so, high-tech “knowledge” companies have moved to Ireland, taking advantage of its well-educated workers. The country has modernized and has a high standard of living.

Rural Ireland ▼



▼ Semiconductor manufacturing



<https://www.pinterest.com/gerardcorcoran/irish-high-tech-industry/>

<https://www.pinterest.com/pin/417990409141684507/>

Investigation: System Change in Ireland, Phase One

Identifying system change obviously requires historical information to compare the system's evolution. You saw this in automobile manufacturing, as automation replaced assembly line workers. We'll use historical data to investigate system change in Ireland.

Working with others, use the data in the following accounts to create a block-and-arrow flowchart showing changes in Ireland and Irish society. Use large paper, Post-It Notes® or something similar for the blocks, and lightly penciled, easily-changed arrows.

Background:

In the early 1800s, Ireland was populated primarily by poor farmers. Few owned the land they farmed. Most rented it from a landlord, a landlord's agent, or from another renter who divided up his land. The annual rent was usually paid in grain such as barley, or in cattle to be shipped to England.

The potato was first brought from the Americas to Europe in 1573 and introduced to Ireland about 1590. By 1780 nearly every meal in every Irish cottage consisted of potatoes, usually with milk or buttermilk, and little else. In places where available, fish were an occasional treat. Meat was rarely eaten—perhaps pork or mutton once or twice a year.

Potatoes are a very nearly perfect food—loaded with complex carbohydrates and vitamins, and containing a fair amount of protein. They need only to be supplemented with a little high-quality protein from milk, milk products or fish in order to sustain healthy human life. In 1836 the Poor Inquiry survey determined that one acre could yield an average of 6.5 to 8.5 tons of potatoes and sometimes more. One acre could feed 6 people for a year.

Potatoes were also fed to cattle to fatten them before they were shipped.

Potatoes grow well in the wet, rocky soil of Ireland, but the development of “lazy-beds” greatly increased potato production.

Lazy-beds are rows or mounds of earth three or four feet wide with ditches on each side to drain off excess moisture. Often the earth is placed on top of a layer of seaweed or sod to increase drainage. Lazy-beds can be used on steep hillsides or in low, swampy ground—in fact, almost anywhere. An observer wrote in 1816 that “soft bogs, rocky ground and steep hillsides cannot be plowed, but with very little expense a potato crop can be had from all of these, and after the second crop the soil is so mellow potatoes can be planted using only a spade and very little labor.”

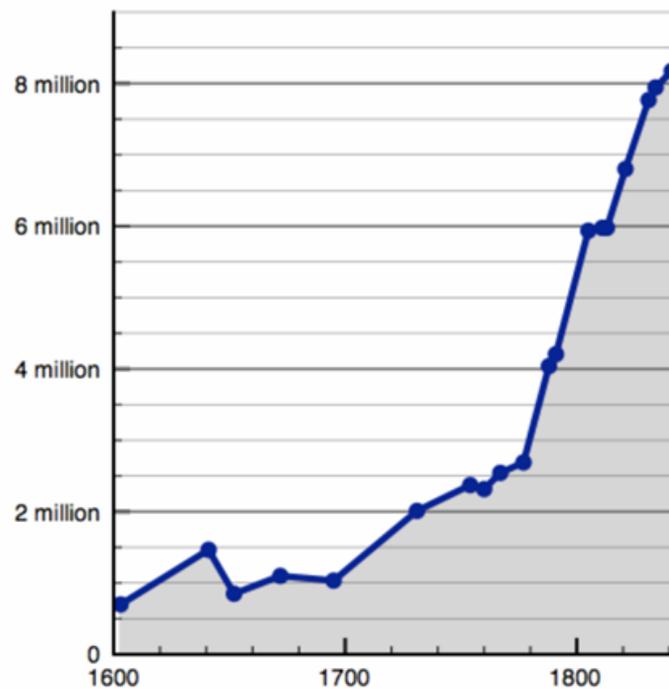
An Irish Action Pattern of the time:¹

The standards...of Irish life encouraged young couples to marry early. No savings were necessary, no outlay was required; a stone cabin was erected for little or nothing in a few days, the young people secured a scrap of land, owned a pot, perhaps a stool, not always a bed.

Asked why the Irish married so young, the Catholic Bishop of Raphoe told the Irish Poor Enquiry of 1835: “They cannot be worse off than they are, and...they may help each other.”

<https://en.wikipedia.org/wiki/Ireland>

The population of Ireland:



About the land:²

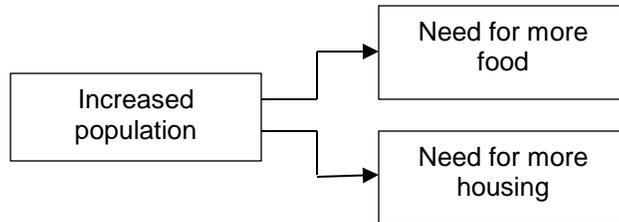
Grazing and farm land was divided and re-divided into ever-smaller units. The “cow’s grass” (land enough to graze one cow) or “sum” was divided first into quarters, then even these small pieces of land were divided in half. The confusion in land holdings [by renters] as a result of sub-division made record-keeping almost impossible. In one case, a half-acre field was held by 26 different people.

¹ Cecil Woodham-Smith, *The Great Hunger*. New York 1962, Harper and Row, p. 30.

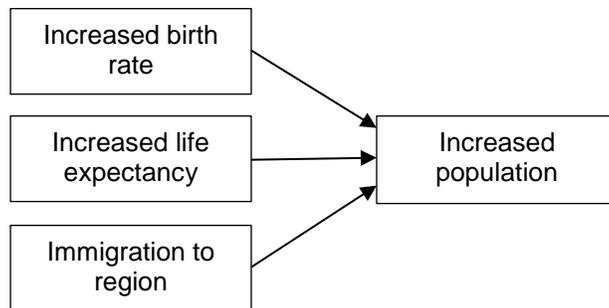
² K. H. Connell, *The Population of Ireland, 1750-1845*, Oxford University Press, 1950 (adapted)

Complex Causation:

The flowcharts you're creating are also called "cause-effect" diagrams. You've probably already diagrammed situations where one "cause" had two or more "effects:"

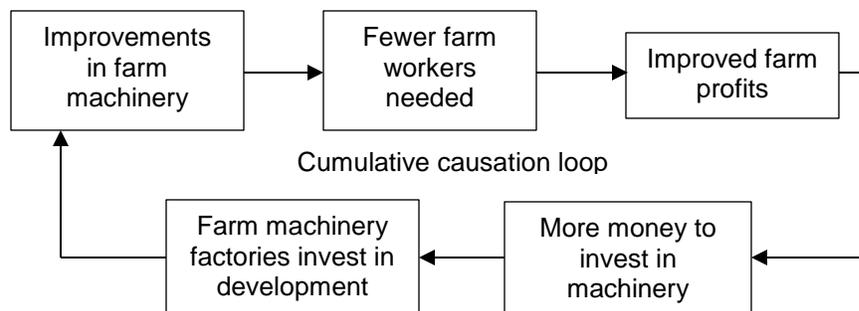


Sometimes one "effect" has more than one cause:



This is called "multiple causation."

Sometimes system changes circle back and reinforce the change. This is called "cumulative causation." For example (from modern times):



As you develop your diagrams, identify situations where complex causation is occurring.

Investigation: System Change in Ireland, Phase Two

Use the data in the boxes to flowchart further changes in Ireland. Mark the blocks to show the system change phase (1 or 2).

The 1845 potato crop seemed, at first, to be excellent—plenty of potatoes, and when they were first dug, they seemed fine. The farmers, as usual, put them into storage—often small cellar holes dug into a dry hillside, lined with a thick layer of fern leaves.

Within a few days, the fine-looking new potatoes turned into a black, rotten, stinking mass—completely inedible. Three-quarters of the crop was lost; in some areas, the entire crop was gone. The potato crop continued failing for five years, caused by a fungus that had originated in America.

Below: <http://www.maggielblanck.com/Mayopages/Potato.html>



THE CROP THAT FAILED.

Famine and Starvation in the County of Cork. *The Illustrated London News*, Jan. 16, 1847:

“SKIBBEREEN.—In the parish of Kilmoe, fourteen died on Sunday; three of these were buried in coffins, eleven were buried without other covering than the rags they wore when alive. And one gentleman, a good and charitable man, speaking of this case, says—‘The distress is so appalling, that we must throw away all feelings of delicacy;’ and another says—‘I would rather give one shilling to a starving man than four shillings six pence for a coffin.’ One hundred and forty have died in the Skibbereen Workhouse in one month; eight have died in one day! And Mr. M’Carthy Downing states that ‘they came into the house merely and solely for the purpose of getting a coffin.’ The Rev. Mr. Clancy visits a farm, and there, in one house, ‘he administered the last rites of religion to six persons.’ On a subsequent occasion, he ‘prepared for death a father and a daughter lying in the same bed.’ Dr. Donovan solemnly assures a public meeting that the people are ‘dropping in dozens about them.’ Mr. Marmion says that work on the public road is even more destructive than fever; for the unfed wretches have not energy enough to keep their blood in circulation, and they drop down from the united effects of cold and hunger—never to rise again.

Weakened by starvation, Irish people were often killed by disease—primarily typhus. Below: Starving family in a hut (photograph):



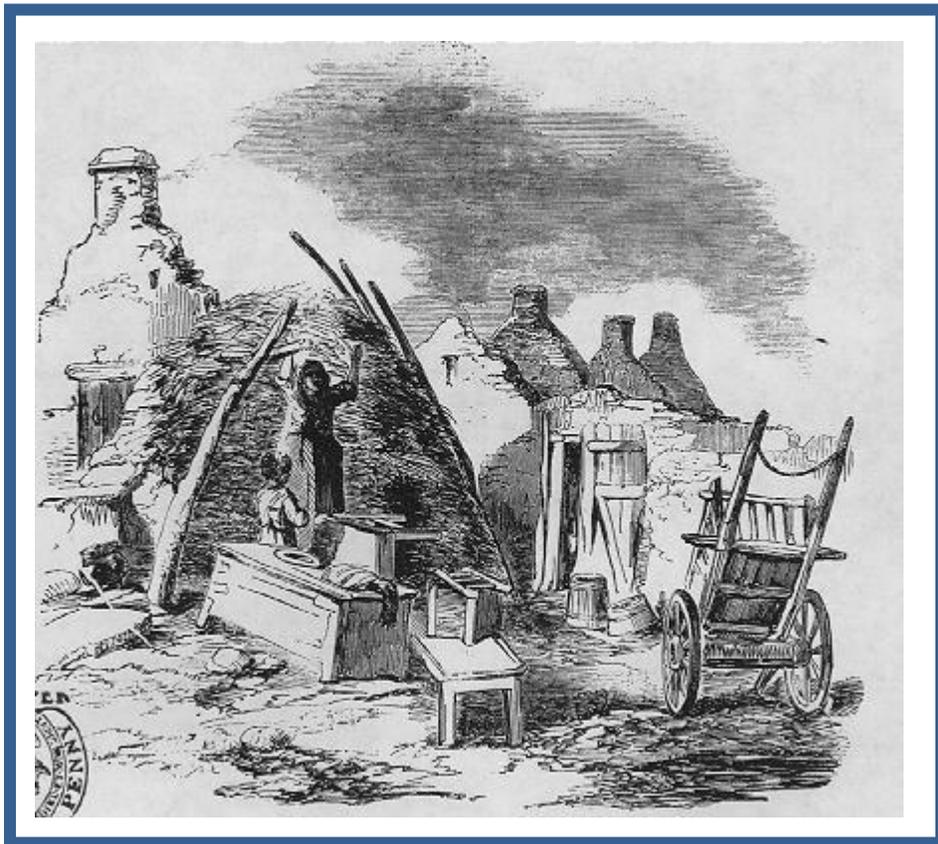
<http://xroads.virginia.edu/~hyper/sadlier/irish/photos.htm>

Sick and starving Irish farmers were unable to pay rent on their land. The results:¹

Bishop Thomas Nulty of County Meath...calculated that close to 30,000 homes were leveled in Meath between 1843 and 1871. Nulty described evictions in his writing. "The speechless agony of men, the piteous wailings of women, the terror and consternation of children, as their houses are pulled down, their homes demolished, and themselves set adrift on the world -- all contribute to make up a horrible scene that . . . can never be forgotten throughout the length and breadth of the locality in which it occurred."

If a landlord wanted to consolidate farmland to sell or rent to others for more income, evictions sometimes occurred even if the farmer had paid his rent for the year.

Evicted farmers often lived in makeshift shelters, called "scalps" or "scalpeens."



"Scalpeen of Tim Downs at Dunmore," from the *London Illustrated News*, 1849.

¹ Alfred P. Smyth, *Faith, Famine and Fatherland in the Irish Midlands: Perceptions of a Priest and Historian Anthony Cogan, 1826-1872*. Dublin: Colour Books Ltd., 1992.

From the *Census of Ireland, 1851*, part v:

A magistrate in Galway, defending a poor prisoner brought up for stealing food, said that to his own knowledge...he and his family had actually consumed part of a human body lying dead in the cabin with them...starving people lived on the carcasses of diseased cattle, upon dogs and dead horses, but principally on the herbs of the field, nettle tops, wild mustard, and water cresses. In some places dead bodies were found with grasses in their mouths.

Estimates of the total deaths from the “Potato Famine” range from a low of 700,000 to 1,500,000 or more. Most accounts assume at least a million people died of starvation, disease or exposure.

Investigation: System Change in Ireland, Phase Three

Complete constructing your block-and-arrow diagram, based on data in this section, marking new blocks “3” (for the phase).

Between 1846 and 1851, approximately one million Irish people emigrated; some to England and Canada, many to the United States. By 1855, about two million had left.

Immigration to the U.S. from Ireland: ►

https://en.wikipedia.org/wiki/Irish_Americans

Period	Number of immigrants
1820-1830	54,338
1831-1840	207,381
1841-1850	780,719
1851-1860	914,119
1861-1870	435,778
1871-1880	436,871
1881-1890	655,482
1891-1900	388,416
1901-1910	399,065

People emigrating from Ireland wrote letters to relatives left behind, and sometimes sent money. How might this affect the situation?

Irish Land Holdings		
Farm size	Number of farms	
	1841	1851
1 – 5 acres	310,436	88,083
5 – 15 acres	252,799	191,854
15 – 30 acres	79,342	141,311
over 30 acres	48,625	149,090

(Irish census)

Some changes can be inferred that aren't shown directly. For example, the table below indicates one important change in Irish Action Patterns that would have major effects on Irish Demographics.

Think about and discuss each change to identify additional changes that would be likely to occur, and show them on your diagram.

Unmarried persons, 1926				
Nation	30 years old		40 years old	
	Female	Male	Female	Male
Irish Free State	50%	71%	30%	45%
United States	18%	31%	11%	18%

From interviews conducted in the early 1930s:¹

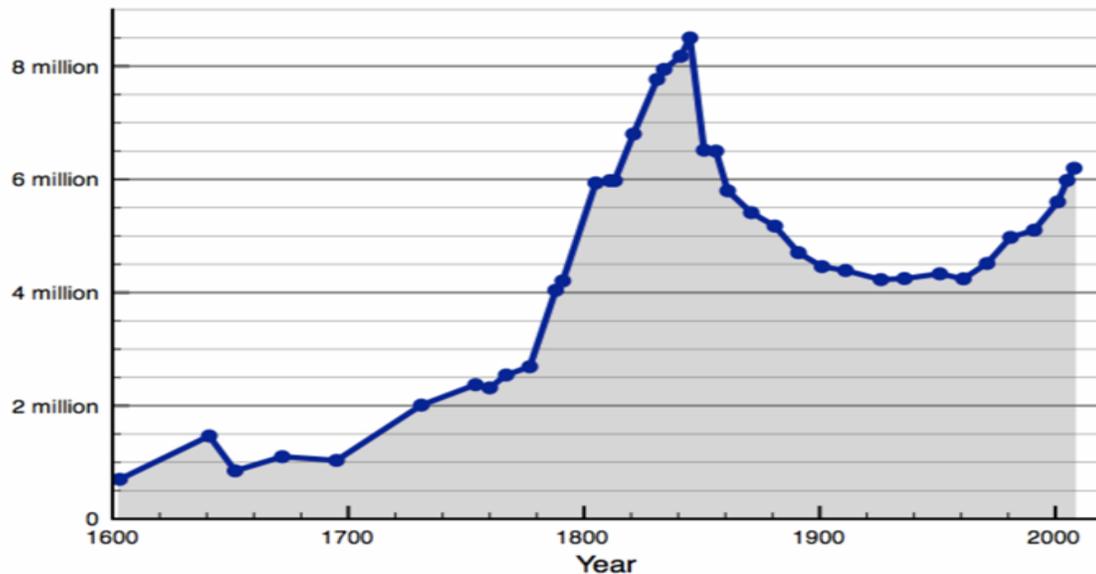
If there are two sons...one of them gets the farm, and when the old people find a girl with a suitable dowry, and the son marries her, they give the dowry money over to the next son, or they provide with it for the other children who haven't yet gone off...You'll go out to a small farm and see several able-bodied men and women waiting around for the oldest son to get married, and for their share of the money the wife brings in.

“Dowry” is goods or money given by the bride’s family to the husband’s family.

¹ Conrad M. Arensburg and Solon T. Kimball, *Family and Community in Ireland* (2nd. ed., 1968, Cambridge, Mass. Harvard University Press, p. 112. (adapted) (Data in center table are from the same source.)

<https://en.wikipedia.org/wiki/Ireland>

Population of Ireland



Another 1930s Irish pattern:¹

Even though a farmer's son may be 45 or 50 years old, if the old couple have not yet given him the farm, the countryman remains a "boy" in the viewpoint and language of his neighbors. One of these sons, complaining, said to the interviewer, "You can be a boy here forever as long as the old fellow is still alive."

The authors have seen full-grown men come into shops to buy something such as a bag of meal, and say that the "old fellow" will pay for it. A few days later the old fellow arrives to pay for the goods "my young fellow got."

- 1: By 1841, industry in England and America was expanding rapidly. Explain how knowledge of this in Ireland affected events.**
- 2: Go back over your block diagram, and, for each block, identify and mark the category (or categories) of the Model that apply.**
- 3: Choose two of the changes you identified in Phase Three, and explain (in your journal) their relationship to the famine.**

¹ Arensburg and Kimball, op. cit., pp. 54-55 (adapted).



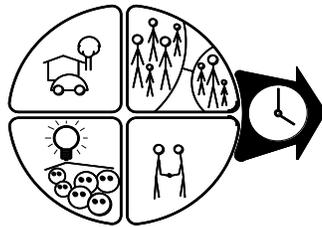
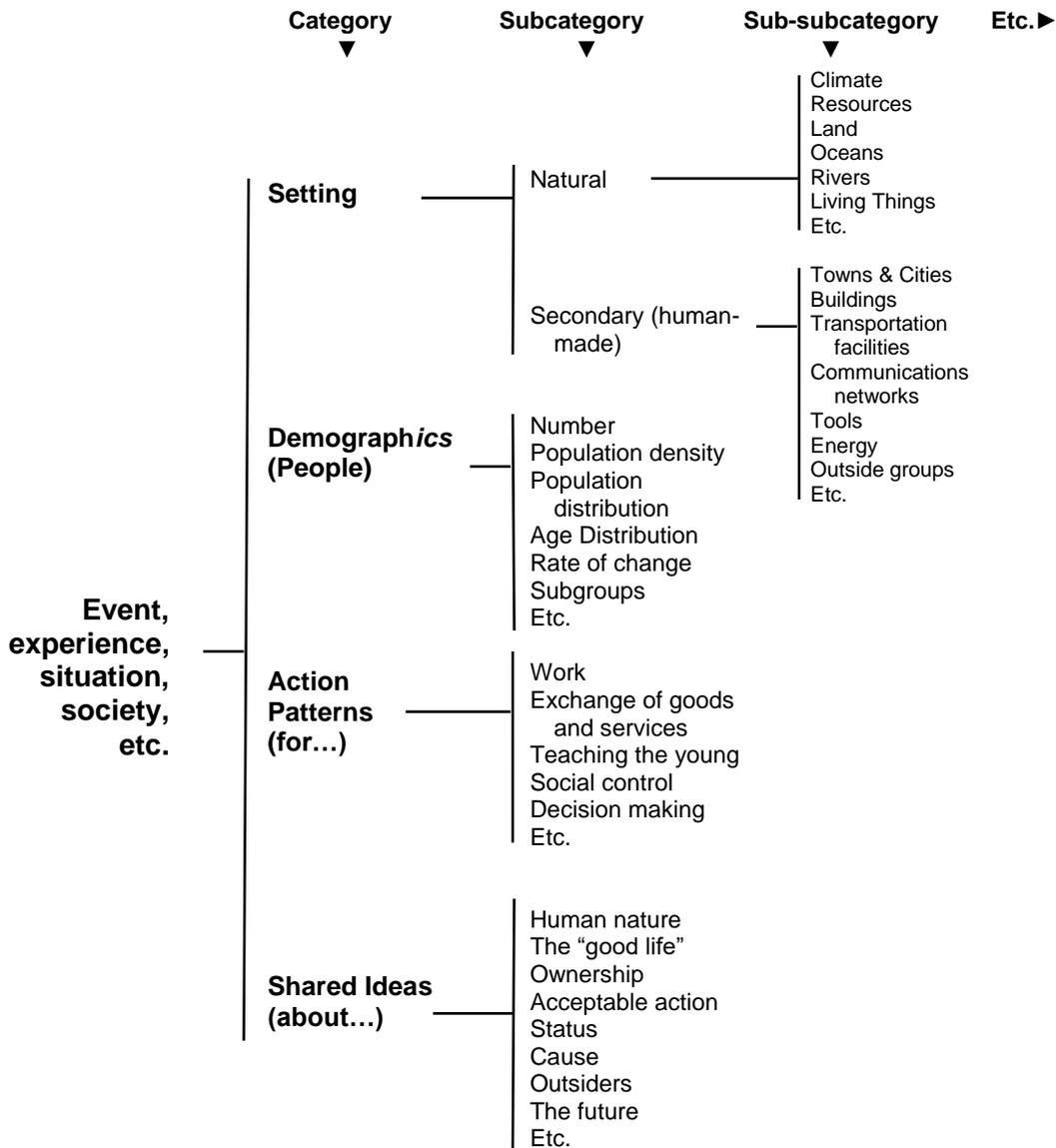
<https://www.youtube.com/watch?v=jobyxXqZCCg>

Dublin ▼



<http://www.irishmirror.ie/news/irish-news/irish-weather-hail-rain-thunder-7627734>

Analyzing system change and predicting its effects is easier if your system categories are expanded with useful sub-categories, as you did in Part 2. Here's an expanded Model that may help with your investigations. Note that every subcategory and sub-subcategory may be expanded further:



Time & Systemic Relationships:
 In every situation, each category (and sub-category) is affected by many others. Changes across time can occur in every category, triggering other changes.

Vanuatu

Investigation: System Change in Vanuatu

Vanuatu (Van-NWAH-too) is a Pacific Island nation—a cluster of islands formerly called (by outsiders) “New Hebrides,” 1750 km. east of northern Australia. The population is about 290,000.

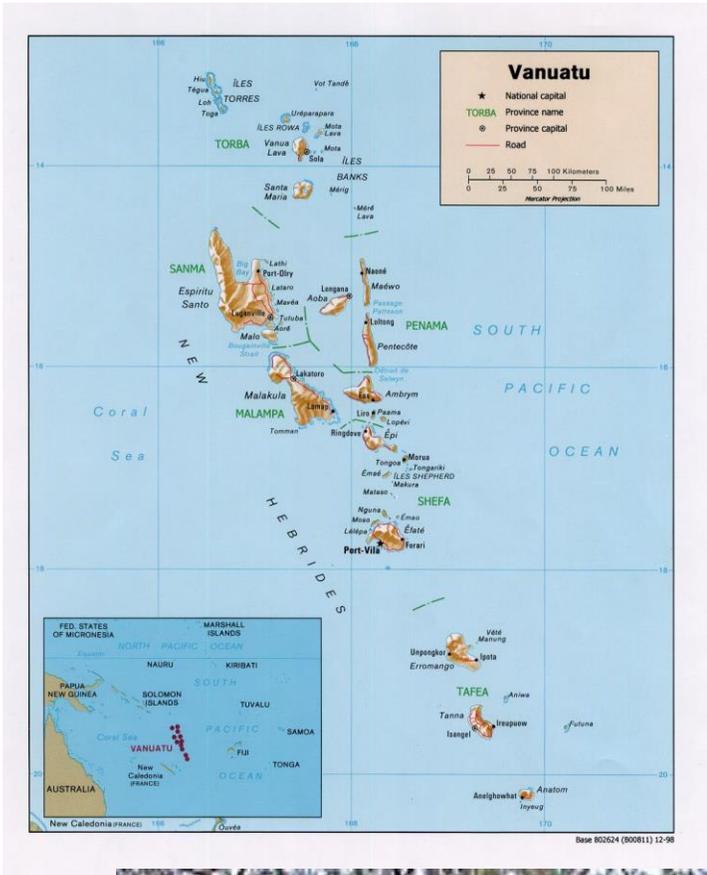
The original settlers and primary inhabitants (98.5%) are “Melanesians,” dark-skinned people kin to the original inhabitants of New Guinea and Australia.

Most native people worldwide have had their lives changed in important ways by contact with Western Society—Europeans and North Americans. The changes were particularly dramatic for some of the people of Vanuatu.

As you did for the Irish, diagram the system changes that occurred in Vanuatu society, as described in the following pages.

<http://geography.about.com/od/vanuatumaps/>

<https://en.wikipedia.org/wiki/Vanuatu>



Phase 1:¹

The native societies of Melanesia generally shared a political system in which individuals gained prestige through gift exchanges. The more wealth a man could distribute, the more people in his debt and the greater his renown. Those unable to give gifts of equal value in return were identified as "rubbish men."

British Christian missionaries arrived—mainly Presbyterians from Scotland—and imposed new rules ending native Action Patterns: Dancing, swearing, adultery, and polygamy were forbidden. Work and entertainment were prohibited on Sundays.

*Misunderstandings are common when people from different cultures meet:*²

...the arrival of the Whites [*missionaries and others*] was accepted, even welcomed, for it meant access to bully [*canned*] beef and cigarettes, shirts, kerosene lamps, whisky, and bicycles. It also meant access to the knowledge behind these material goods, for the Europeans brought missions and schools as well as cargo...

The story now began to circulate [*among the Melanesians*] that it was not the Whites who made the cargo, but dead ancestors. To people who knew nothing about factory production, this made sense. White men did not work; they merely wrote secret signs on scraps of paper, for which they were given shiploads of goods. On the other hand, the Melanesians labored week after week for pitiful wages. Plainly the goods must be made for Melanesians somewhere, perhaps in the Land of the Dead. The Whites, who possessed the secret of the cargo, were intercepting it and keeping it from the hands of the islanders, to whom it really belonged. In the Madang district of New Guinea, after some 40 years' experience of the missions, the natives went in a body one day with a petition demanding that the cargo secret should now be revealed to them, for they had been very patient.

About 1930 some of the people rebelled, led by a real or (perhaps) mythical person called "John Frum,"—probably based on "John from Jesus Christ" (John the Baptist). The rebels retreated into the mountains to return to their old ways of living away from the strict rules of the Presbyterians.

¹ https://en.wikipedia.org/wiki/Cargo_cult and other sources.

² <https://www.scientificamerican.com/article/1959-cargo-cults-melanesia/>

Phase 2:¹

One day in the early 1940s, hundreds of thousands of American soldiers began arriving by sea and by air to the isolated group of islands. The world was engaged in World War II, and America needed to build bases on these Pacific islands. The newcomers recruited the locals' assistance in constructing hospitals, airstrips, jetties, roads, bridges, and corrugated-steel Quonset huts, all of which were strange and wondrous to the natives. But it was the prodigious amounts of war materiel that were airdropped for the US bases that drastically changed the lifestyle of the islanders. They watched as aircraft descended from the sky and delivered crates full of clothing, tents, weapons, tools, canned foods, and other goods to the island's new residents. The islanders had never before seen anything like this wealth and variety of goods. The natives learned that this bounty from the sky was known to the American servicemen as "cargo."

(Continued)

How did the Americans pay the local people who helped them? Based on their Action Patterns and Shared Ideas (Phase 1), how did this make the people feel about their status relative to the Americans?



◀ *An F4U Corsair fighter plane on Espiritu Santo, Vanuatu's largest island, 1943*

"Ethnocentrism" is a way of thinking common to people in most societies. They believe that their own ways of acting and thinking are the "right" ones, so different ones of other people are, therefore, "wrong." Overcoming ethnocentrism requires us to look at reality from other points of view. ***As you read the following, try to look at the situation from the point of view of the local people.***

https://en.wikipedia.org/wiki/Turtle_Bay_Airfield

¹ <https://www.damninteresting.com/john-frum-and-the-cargo-cults/> Article #248, written by Gerry Matlack. Unless noted otherwise, remaining text is from this article (adapted).

Phase 3:

The islanders were astonished at the sight of black GIs among the ranks, enjoying all the benefits of cargo that the white soldiers enjoyed — benefits long denied to the black islanders.

The islanders believed that their own dead ancestors continued to influence the communities of the living, and that their ancestors would one day come back to life and distribute to them unimaginable wealth. Therefore they reasoned that the white people must have had connections to their own ancestors, who would logically be the only ones powerful enough to rain down such wondrous riches.

The John Frum legend changed, recasting the religious icon as a black American infantryman. It was said that John Frum lived inside the island's volcano, called "Yasur"— the native word for "God."

When the war ended several years later, the Americans departed as suddenly as they had arrived. Military bases were abandoned, and the steady flow of cargo which had altered the islanders' lives, dried up completely. The men and women of Tanna Island had grown to enjoy the radios, trucks, boats, watches, iceboxes, medicine, Coca-Cola, canned meat, and candy, so they set into motion a plan to bring back the cargo. They had surreptitiously learned the secrets of summoning the cargo by observing the practices of the American airmen, sailors and soldiers.

The islanders set to work clearing their own kind of landing strips, and they erected their own control towers strung with rope and bamboo aerials. They carved wooden radio headsets with bamboo antennae, and even the occasional wooden air-traffic controller. Day after day, men from the village sat in their towers wearing their replica headsets as others stood on the runways and waved the landing signals to attract cargo-bringing airplanes from the empty sky. More towers were constructed, these with tin cans strung on wires to imitate radio stations so John Frum could communicate with his people. Piers were also erected in an effort to attract ships laden with cargo, and the Red Cross emblem seen on wartime ambulances was taken as the symbol of the resurging religion.

Note: Your first reaction to the islander's actions may be, "That's just stupid!" That's an "ethnocentric" reaction. What the islanders are doing makes sense from their point of view. **How do they feel the ancestors are acting toward them?**

Their actions are based on the assumption (common to everyone) that if a particular action is followed by an event of some sort, the action **caused** the event. If you have a bad cold, and on the third day you drink grapefruit juice and rapidly improve, you might assume that the grapefruit juice caused the improvement. People who study logic call this fallacy by the Latin phrase *post hoc, propter hoc* (after this, therefore because of this). It's an error historians often make.

Another source:¹

Attempting to get cargo to fall by parachute or land in planes or ships, islanders imitated the action of soldiers, sailors, and airmen. They mimicked the day-to-day activities and dress styles of US soldiers, such as performing parade ground drills with wooden or salvaged rifles...They lit signal fires and torches to light up runways and lighthouses.

...[M]any built life-size replicas of airplanes out of straw...hoping to attract more airplanes. The cult members thought that the foreigners had some special connection to the deities and ancestors of the natives, who were the only beings powerful enough to produce such riches.

<https://sciencebasedmedicine.org/cargo-cult-psychology/>



¹ https://en.wikipedia.org/wiki/Cargo_cult



<http://tripfreakz.com/offthebeatenpath/the-cargo-cult-of-john-frum-and-false-prophet-fred-in-vanuatu>

Phase 4:

Every year on February 15th, natives of Tanna Island in the Republic of Vanuatu hold a grand celebration in honor of...John Frum. Villagers clothe themselves in homemade U.S. Army britches, paint “USA” on their bare chests and backs, and run a replica of the U.S. flag up the flagpole alongside the Marine Corps Emblem and the state flag of Georgia. Barefoot soldiers then march in perfect step in the shadow of Yasur, the island’s active volcano, with red-tipped bamboo “rifles” slung over their shoulders. February 15th is known as John Frum Day on Tanna Island...

With tourism and gradual growth of prosperity, the “John Frum” cult is fading. Similar cults that arose after World War II in other locations in the South Pacific have disappeared.

As with your earlier block diagram, mark your flow chart blocks with the phase of system change, and show Model categories.

Similar Action Patterns have occurred many times in many other places. Almost always, members of a society who develop such patterns are stressed. They feel a lack of control of their fate, with no way to regain it.

In your opinion, is this a reasonable explanation for the system changes you’ve diagrammed?

Investigation: Flowcharting Future Change

Working with others, choose one of the following possible changes, and diagram additional changes that might occur as a result of the first change.

You may find it helpful to use the expanded Model (page 16); for each subcategory, ask yourself, “Would the change I’m investigating possibly change THIS?” and “If this changes, what else would change?”

When a person is deliberately telling a lie, the associated stress causes slight changes in their voice. “Voice stress analyzers” have been built that detect these changes, and can indicate with some accuracy if the person is lying. Lying also causes slight changes in facial muscles and eye movements that trained observers can detect.

It seems likely that a smartphone application could be designed that would combine a voice stress analyzer with a face/eye movement analyzer, to determine, with reasonable certainty, if a person is being truthful or not.

Over 60% of the world’s farmland is used for cattle raised for beef. Farmland is also used for other animals that supply meats such as pork, chicken and turkey, so a great deal of land is used to raise animals for food.

Scientists are developing synthetic meats, made either by processing vegetables such as corn or soybeans, or by growing cells from animal tissue in cultures. Their goal is to create meat that consumers can’t tell from the real thing. Low-cost production of high-quality synthetic beef and other meats seems likely in the future. Synthetic fish meat is also being developed.

Self-driving cars will almost certainly reduce accidents to a fraction of the present rate, and car ownership will likely decline as people simply call for a car when needed, paying only for time and distance ridden.

Fast food restaurants—McDonald’s®, Burger King®, Wendy’s® and many others—now supply “entry-level jobs” for millions of young people. But nearly everything fast food workers are now doing could be done by machines and computers. If you’re a customer, a computer could take your order (from your smartphone), receive payment (also from your smartphone account—no cash), and control a machine that makes ground beef patties, fries them, puts them on buns, makes the French fries, puts all of it in a bag and hands it to you. Everything a fast food restaurant does can be done with almost no workers.

<http://ksscensorthis.com/1777/uncategorized/put-yourself-in-our-shoes/>



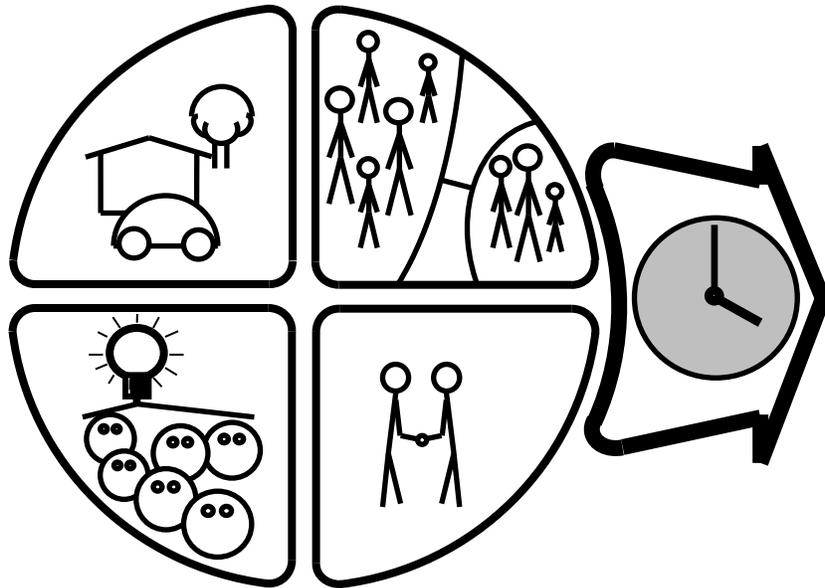
Investigation: System Change Here and Now

Important changes are happening almost everywhere, but sometimes they're easy to overlook.

Identify system change in your own community, city, or county:

- 1: Gather demographic data for the past 30 years or so. You may already have some of this information from earlier investigations. (Choose a time interval over which major change has occurred, but not more than 50 years.)***
- 2: Identify and interview older adults who've lived in your area and remember what the area was like earlier—as far back as they can recall. Ask them what they see as important changes.***
- 3: If possible, find copies of old newspapers (in library archives, for example) for your area.***
- 4: Use the Model to analyze this data, and identify system changes. For example, how has demographic change affected the human-made setting? Identify changes in Action Patterns having to do with transportation, communications, business or government, and give reasons for the changes.***
- 5: Show changes you've identified in a flowchart similar to the others you made earlier.***





For Teacher/Mentor:

“Imagination,” said Albert Einstein, “is more important than knowledge.”

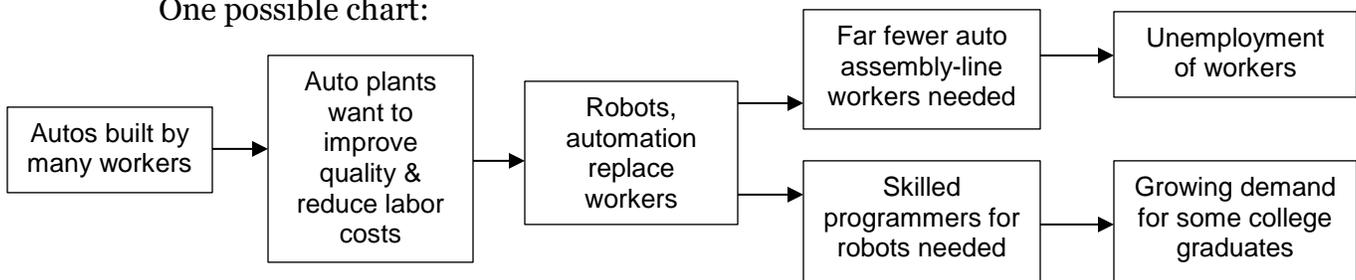
A significant number of the problems societies encounter stem from a lack of imagination. A decision maker’s well-intentioned action generates unintended and unwanted consequences.

Given the inherent complexity of modern life, this isn’t surprising. The number of variables in almost any randomly chosen situation make prediction difficult.

“Systems thinking” addresses that problem. The industrial revolution impacted human life worldwide more than any other event in history, and that impact continues as industries adopt new technologies. Often, the effects of change are difficult to predict, but being able to imagine probable and possible consequences is essential. Oversimplified assumptions about the effects of industrial and government action (or inaction) make old problems worse, and create new ones. Developing our learner’s abilities to better understand systems is crucial to a healthy future for humankind.

Investigation: Flowcharting Change

One possible chart:

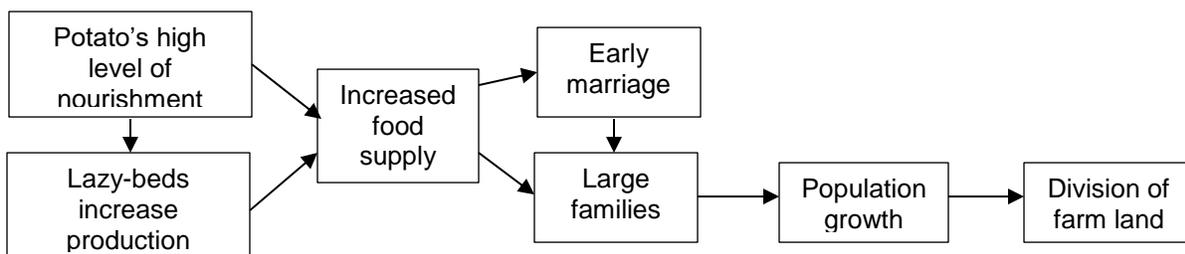


Investigation: System Change in Ireland, Phase One

This set of three investigations of the Potato Famine should be fairly easy for most learners. It’s a straightforward process of summarizing the data in each data box into one or two short statements, then finding cause-effect relationships between the blocks.

The population explosion in Ireland (graph p. 6) can be seen as a test case for the theories of Thomas Malthus. In 1798, he pointed out that populations, if unconstrained, increase geometrically, but food production, at best, increases arithmetically. One reason for large families not suggested by the data we’ve supplied is that they were a form of old-age insurance for the parents.

One version of the flowchart for Phase One:

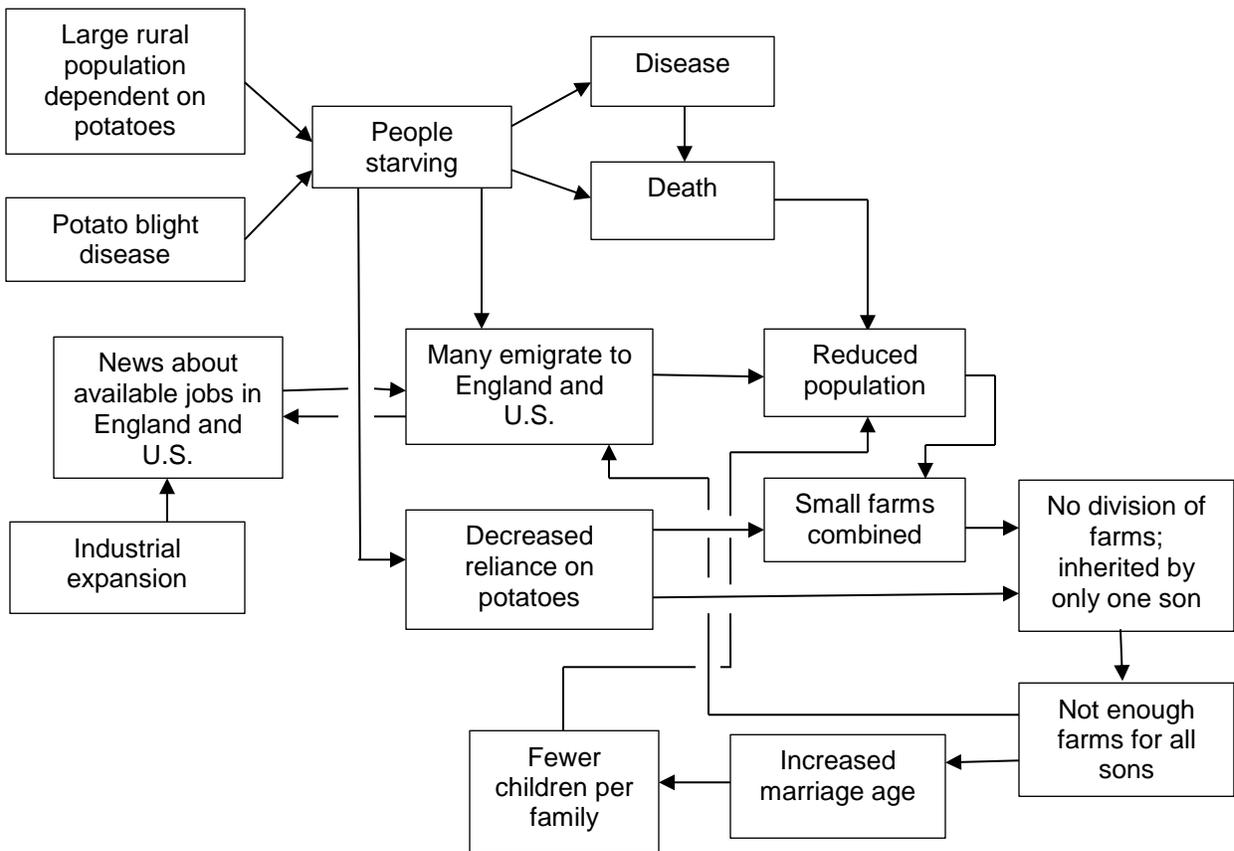


The result, of course, is high rural population density, vulnerable because of its dependence on a single crop. The one variety of potato raised in Ireland, which produced large tubers, turned out to be especially susceptible to damage from the blight fungus.

Flowcharts produced by learners may be significantly different from the one shown here. As with other learner response, if the chart is reasonably complete, and the relationships shown by arrows are logically defensible, that's success. If boxes linked by arrows seem unrelated, ask learners, "Did this *cause* that?"

Investigation: System Change in Ireland, Phase Two (and Three)

A possible flowchart for these phases is below. Depending on learner ages and the effectiveness of the work groups, their flowcharts may, of course, be less complete. There are some potential "cumulative causation" loops here. A simple one is the way emigration was helped along with the money and success stories sent back to Ireland by previous immigrants.



This is complex, but any flowchart of this sort is, of course, simpler than reality. We've not included much data for the role of landlords—many of them English, and about half of them absentee—in affecting the situation. Some landlords were compassionate to their renters, and did what they could to ameliorate their plight. Some stopped soliciting rent from tenants. Some evicted tenants, but paid

their passage on ships to England or America. Most did nothing to help, and many evicted them coldheartedly. One source for more data on this:

<http://www.historyhome.co.uk/c-eight/ireland/ire-land.htm>

Investigation: System Change in Vanuatu

The procedure here is the same as for the Irish. We debated not using this material, but it gives an opportunity to raise the issue of ethnocentrism, and reinforces the concepts related to system change.

The islanders' actions show their Shared Ideas related to the Model subcategory of "causation." Applying the expanded Model to this data will help demonstrate its utility. The overall question, "What causes system change?" is worth applying here as deeply as possible.

The logic sequence, from the standpoint of the islanders:

- (1) Wealth comes from ancestors.
- (2) The great wealth of the American soldiers, therefore, also came from ancestors.
- (3) Our own ancestors were helping us share the American's wealth.
- (4) The wealth is no longer coming to us, so our ancestors must have deserted us.
- (5) To get the wealth and good fortune to return, we must use the methods the Americans used.

Step 4 in this logic chain is accompanied with great stress, leading to intense motivation for step 5. Not just material wealth, but avoidance of all kinds of bad fortune was the result of beneficence of the ancestors, so their apparent desertion was a calamity.

"...at this point it should be observed that cults of this general kind are not peculiar to Melanesia. Men who feel themselves oppressed and deceived have always been ready to pour their hopes and fears, their aspirations and frustrations, into dreams of a millennium to come or of a golden age to return. All parts of the world have had their counterparts of the cargo cults, from the American Indian ghost dance to the communist-millennarist "reign of the saints" in Munster during the Reformation, from medieval European apocalyptic cults to African "witch-finding" movements and Chinese Buddhist heresies. In some situations men have been content to wait and pray; in others they have sought to hasten the day by using their strong right arms to do the Lord's work. And always the cults serve to bring together scattered groups, notably the peasants and urban plebeians of agrarian societies and the peoples of "stateless" societies where the cult unites separate (and often hostile) villages, clans and tribes into a wider religiopolitical unity."¹

¹ Peter M. Worsley, "50 Years Ago: Cargo Cults of Melanesia." *Scientific American*, May 1, 2009.
<https://www.scientificamerican.com/article/1959-cargo-cults-melanesia/>

Investigation: Flowcharting Future Change

If learners follow the instructions, using the expanded Model to identify possible changes, their grasp of important subcategories and sub-subcategories will be reinforced. However, unless they've identified intermediate changes, some cause-effect relationships may be unlikely.

For example, a universally-available smartphone lie detector *might* have indirect effects on the society's economic system, but it's difficult to see how this would occur. A learner giving this hypothesis should give additional explanation that could be evaluated, perhaps by peers.

Investigation: System Change Here and Now

"Identifying system change in the Target Area" would be the logical investigation at this point. However, identifying data for that investigation is certain to be difficult, and likely to be frustrating. Even asking older adults "how was school different when you were young?" may yield little information besides "no computers" or some unprovable statement such as "We worked harder." This is why the investigation moves beyond the Target Area to some convenient larger entity, so it can look at system change more broadly, not just in schooling.

The investigation is straightforward, similar to previous ones.

March 2017