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Policies that support degrowth include the provision of high-quality, affordable public housing, such as that in Vienna.

Degrowth can work – here's how science can help

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Wealthy countries can create prosperity while using less materials and energy if they abandon economic growth as an objective.

The global economy is structured around growth – the idea that firms, industries and nations must increase production every year, regardless of whether it is needed. This dynamic is driving climate change and ecological breakdown. High-income economies, and the corporations and wealthy classes that dominate them, are mainly responsible for this problem and consume energy and materials at unsustainable rates^{1,2}.

Yet many industrialized countries are now struggling to grow their economies, given economic convulsions caused by the COVID-19

pandemic, Russia's invasion of Ukraine, resource scarcities and stagnating productivity improvements. Governments face a difficult situation. Their attempts to stimulate growth clash with objectives to improve human well-being and reduce environmental damage.

Researchers in ecological economics call for a different approach – degrowth³. Wealthy economies should abandon growth of gross domestic product (GDP) as a goal, scale down destructive and unnecessary forms of production to reduce energy and material use, and focus economic activity around securing

human needs and well-being. This approach, which has gained traction in recent years, can enable rapid decarbonization and stop ecological breakdown while improving social outcomes². It frees up energy and materials for low- and middle-income countries in which growth might still be needed for development. Degrowth is a purposeful strategy to stabilize economies and achieve social and ecological goals, unlike recession, which is chaotic and socially destabilizing and occurs when growth-dependent economies fail to grow.

Reports this year by the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) suggest that degrowth policies should be considered in the fight against climate breakdown and biodiversity loss, respectively. Policies to support such a strategy include the following.

Reduce less-necessary production. This means scaling down destructive sectors such as fossil fuels, mass-produced meat and dairy, fast fashion, advertising, cars and aviation, including private jets. At the same time, there is a need to end the planned obsolescence of products, lengthen their lifespans and reduce the purchasing power of the rich.

Improve public services. It is necessary to ensure universal access to high-quality health care, education, housing, transportation, Internet, renewable energy and nutritious food. Universal public services can deliver strong social outcomes without high levels of resource use.

Introduce a green jobs guarantee. This would train and mobilize labour around urgent social and ecological objectives, such as installing renewables, insulating buildings, regenerating ecosystems and improving social care. A programme of this type would end unemployment and ensure a just transition out of jobs for workers in declining industries or ‘sunset sectors’, such as those contingent on fossil fuels. It could be paired with a universal income policy.

Reduce working time. This could be achieved by lowering the retirement age, encouraging part-time working or adopting a four-day working week. These measures would lower carbon emissions and free people to engage in care and other welfare-improving activities. They would also stabilize employment as less-necessary production declines.

Enable sustainable development. This requires cancelling unfair and unpayable debts of low- and middle-income countries, curbing unequal exchange in international trade and creating conditions for productive capacity to be reoriented towards achieving social objectives.

Some countries, regions and cities have already introduced elements of these policies. Many European nations guarantee free health care and education; Vienna and Singapore are renowned for high-quality public housing; and nearly 100 cities worldwide offer free public transport. Job guarantee schemes have been used by many nations in the past, and experiments with basic incomes and shorter working hours are under way in Finland, Sweden and New Zealand.

But implementing a more comprehensive strategy of degrowth – in a safe and just way – faces five key research challenges, as we outline here.

Remove dependencies on growth

Economies today depend on growth in several ways. Welfare is often funded by tax revenues. Private pension providers rely on stock-market growth for financial returns. Firms cite projected growth to attract investors. Researchers need to identify and address such ‘growth dependencies’ on a sector-by-sector basis.

For example, the ‘fiduciary duty’ of

“Social movements and cultural change brewing below the surface often precede and catalyse political transformation.”

company directors needs to be changed. Instead of prioritizing the short-term financial interests of shareholders, companies should prioritize social and environmental benefits and take social and ecological costs into account. Sectors such as social care and pensions need secure funding mechanisms for public providers, and better regulation and dismantling of perverse financial incentives for private providers⁴.

Balancing the national economy will require new macro-economic models that combine economic, financial, social and ecological variables. Models such as LowGrow SFC (developed by T.J. and P.A.V.), EUROGREEN and MEDEAS are already being used to project the impacts of degrowth policies, including redistributive taxes, universal public services and reductions in working time.

But these models typically focus on a single country and fail to take into account cross-border dynamics, such as movements of capital and currency. For example, if markets are spooked by low growth in one

country, some companies might move their capital overseas, which could adversely affect the original country’s currency and increase borrowing costs. Conditions such as these posed severe financial problems for Argentina in 2001 and Greece in 2010. International cooperation for tighter border control of capital movements needs to be considered and the effects modelled.

Fund public services

New forms of financing will be needed to fund public services without growth. Governments must stop subsidies for fossil-fuel extraction. They should tax ecologically damaging industries such as air travel and meat production. Wealth taxes can also be used to increase public resources and reduce inequality.

Governments that issue their own currency can use this power to finance social and ecological objectives. This approach was used to bail out banks after the global financial crisis of 2007–8 and to pay for furlough schemes and hospitals during the COVID-19 pandemic⁵.

Inflationary risks must be managed, if increased demand outstrips the productive capacity of the economy. Earmarking currency for public services reduces cost-of-living inflation. But a degrowth strategy can also reduce demand for material goods – for example through progressive taxation, by encouraging shared and collaborative consumption, incentivizing renovation and repair, and supporting community-based services.

Another risk is that when states or central banks issue currency, it can increase the service payments on government debt. Research suggests that managing this risk requires careful coordination of fiscal policy (how much governments tax and spend) and monetary policy (how price stability is maintained)⁶. Modelling and empirical research is needed to shed light on the pros and cons of innovative monetary policy mechanisms – such as a ‘tiered reserve system’, which reduces the interest rate on government debt.

Manage working-time reductions

Trials of shorter working hours have generally reported positive outcomes. These include less stress and burnout and better sleep among employees while maintaining productivity⁷. Most trials have focused on the public sector, mainly in northern Europe. But private companies in North America, Europe and Australasia have run trials of four-day weeks, with similar results⁸. However, the companies were self-selecting, and research is needed to test whether this approach can succeed more

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widely, for example outside the white-collar industries that dominate the trials.

Barriers to implementing reduced hours need to be understood and addressed. Per-head staff costs, such as capped tax contributions and health insurance, make it more expensive for employers to increase staff numbers. Personal debt might encourage employees to work longer hours, although recent trials showed no evidence of this^{7,8}.

The understanding of collective impacts is also limited. Outcomes from France's experiments with a 35-hour week have been mixed: although many people benefited, some lower-paid and less-skilled workers experienced stagnant wages and more-intense work⁹. Such pressures need to be studied and addressed. Assumptions that reduced hours result in more employment need to be tested in different sectors and settings. Recent evidence suggests that workers can maintain productivity by reorganizing their work^{7,8}.

Links between hours of work and carbon emissions also need to be established¹⁰. Although less commuting lowers energy use and carbon emissions during compressed work weeks, behaviours during three-day weekends remain underexplored. More travel or shopping during free time could increase emissions, but these effects could be mitigated if production in problem sectors is scaled down.

Reshape provisioning systems

No country currently meets the basic needs of its residents sustainably¹. Affluent economies use more than their fair share of resources², whereas lower-income countries are likely to need to use more. Researchers need to study how provisioning systems link resource use with social outcomes, for both physical systems (infrastructure and technology) and social ones (governments and markets).

Bottom-up studies suggest that better provisioning systems could deliver decent living standards with much less energy use than is required today¹¹. These studies don't fully account for institutions such as the state, and are likely to be underestimates. Top-down studies, which do factor in such institutions, suggest that more energy is required to meet human needs¹². But these studies are unable to separate out wasteful consumption such as big cars or yachts, and are thus likely to be overestimates.

Researchers need to reconcile these approaches, and consider resources besides energy, including materials, land and water. They need to examine the provisioning systems for housing, transportation, communication, health care, education and food. What social and institutional changes would improve provisioning? What types of provision have the most beneficial social and environmental outcomes? Such research can be done using empirical observation, as well as through modelling.

Take housing, for example. In many parts of the world, property markets cater to developers, landlords and financiers. This contributes to segregation and inequality, and can push working people out of city centres so they are dependent on cars, which increases fossil-fuel emissions. Alternative approaches include public or cooperative housing, and a financial system that prioritizes housing as a basic need rather than as an opportunity for profit.

Political feasibility and opposition

Growth is often treated as an arbiter of political success. Few leaders dare to challenge GDP growth. But public attitudes are changing. Polls in Europe show that the majority of people prioritize well-being and ecological objectives over growth (see go.nature.com/3ugg8kt). Polls in the United States and the United Kingdom show support for job guarantees and working-time reductions (see go.nature.com/3uyhdjv and go.nature.com/3y8ujz5). The large numbers of workers who have left their jobs in movements such as the US Great Resignation or the Lying Flat protest groups in China show there is demand for shorter working hours and more humane and meaningful work. Nonetheless, political parties that have put forward degrowth ideas have received limited support in elections. That begs the question: where would the drive for degrowth policy come from?

Social movements and cultural change brewing below the surface often precede and catalyse political transformation. Social scientists should examine four areas. First, they need to identify changing attitudes and practices using polls and focus groups.

Second, they should learn from sustainable 'transition towns', cooperatives, co-housing projects or other social formations that

prioritize post-growth modes of living. The experiences of countries that have had to adapt to low-growth conditions – such as Cuba after the fall of the Soviet Union, and Japan – also hold lessons.

Third, researchers should study political movements that are aligned with degrowth values – from La Via Campesina, the international peasants' movement that advocates food sovereignty and agroecological methods, to the municipalist and communalist movements and governments in progressive cities such as Barcelona or Zagreb, which promote policies favouring social justice and the commons. Better understanding is needed of the obstacles faced by governments that have ecological ambitions, such as those elected this year in Chile and Colombia.

Fourth, a better grasp is needed of the political and economic interests that might oppose or support degrowth. For example, how do groups such as the think tanks, corporations, lobbyists and political parties that work to support elite interests organize, nationally and internationally, to scupper progressive economic and social policy? The role of the media in shaping pro-growth attitudes remains underexplored. Given the links between economic growth and geopolitical power, individual nations might be disinclined to act alone, for fear of facing competitive disadvantage, capital flight or international isolation. This 'first mover' problem raises the question of whether, and under what conditions, high-income countries might cooperate towards a degrowth transition.

What next?

Government action is crucial. This is a challenge, because those in power have ideologies rooted in mainstream neoclassical economics, and tend to have limited exposure



Aubagne in France is one of almost 100 places worldwide offering free public transport.



Young people in Hong Kong hold placards about the Lying Flat movement, which has seen large numbers of workers resigning from jobs.

to researchers who explore economics from other angles. Political space will be needed to debate and understand alternatives, and to develop policy responses. Forums working on this include the Wellbeing Economy Alliance, the Growth in Transition movement in Austria, the European Parliament's Post-Growth conference initiative and the UK All-Party Parliamentary Group on Limits to Growth.

Strong social movements are necessary. Forms of decision-making that are decentralized, small-scale and direct, such as citizens' assemblies, would help to highlight public views about more equitable economies¹³.

Addressing the question of how to prosper without growth will require a massive mobilization of researchers in all disciplines, including open-minded economists, social and political scientists, modellers and statisticians. Research on degrowth and ecological economics needs more funding, to increase capacity to address necessary questions. And the agenda needs attention and debate in major economic, environmental and climate forums, such as the United Nations conferences.

A March 2022 editorial in this journal argued that it is time to move beyond a 'limits to growth' versus 'green growth' debate. We agree. In our view, the question is no longer whether growth will run into limits,

but rather how we can enable societies to prosper without growth, to ensure a just and ecological future. Let's pave the way.

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