Is agribusiness better than small-sale, localised alternative agriculture?

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It omits the first 1,200 wors dealing with the study by Hawes et al.

The wider issue: Comparing agribusiness with alternatives beyond carbon emissions.

The Hawes article is confined to carbon emissions. Whatever the situation in that domain turns out to be the more important question is how does localised food etc. compare with agribusiness production when all relevant cost and benefit factors are taken into account, especially those involving ecological and social sustainability. Following are notes on some of the many factors that need to be considered. It will be argued that this more inclusive comparison shows that agribusiness should be replaced largely or entirely by localised alternative forms of production, especially when elaborated as a result of future R and D. This point should be stressed: current achievements are not the result of science-based efforts to improve performance etc.

Unfortunately but not surprisingly there a few studies and little evidence on these topics, but what there is provides consistent support for the thesis being argued. More importantly, the strength of the following argument draws on theoretical principles and alternative proposals which are obviously desirable regardless of existing evidence. For instance highly food self-sufficient communities are obviously in a good position to recycle all food nutrients back to the soils that produced them. Studies are needed to clarify labour dollar and nutrient flows in such systems but their in-principle desirability needs little in the way of demonstration.

Yields and land area required.

It is commonly believed that small scale localised agriculture cannot produce sufficiently compared with the yields achieved by large scale mechanised and industrialised agribusiness. The following notes indicate that this is incorrect.

Note that performance varies greatly depending on the experience, expertise, and enthusiasm of gardeners. For the purposes of this article it is important to attend to evidence indicating that yields etc. can be high.

The significance of the following evidence might be judged by reference to the Australian commercial wheat production average of between 2 and 3.5 tonnes per ha. (Dept of Agriculture, Fisheries and Forestry, 2024), and the overall commercial vegetable production average of 3 tonnes per ha reported by McDougall, Kristiansen and Radar, (2018.)

Evidence on home gardening.

Records for an intensive Permaculture garden in Melbourne show that after only four years after it was established it was producing at a rate equivalent to 6.6 t//hectare, for a labour input of only around two hours a week. (‘Green Permaculture, 2013, Alexander and Gleeson 2018.)

Another study of 13 community gardens in Sydney found that they were producing at twice the rate of the typical Australian commercial vegetable farm. (Hume, Salomon, and Cavagnaro 2022. See also McDougall, R., P. Kristiansen and R. Radar 2018.)

In RetroSuburbia (2018, pp. 236-238) Holmgren reports on two Permaculture gardens in Victoria producing the equivalent of over 20 t/ha. He estimates that 540 m^2 would be sufficient to provide vegetables for a family. Most Australian urban blocks are around 1000 m^2. One 115 m^2 garden produced 355 hg of vegetables, mushrooms herbs, honey eggs in one year and expected the yield to rise to 550 kg in future. Another produced 329 kg from 70 m^2. Abdulla home garden produced 275 kg vegies, 169 kg of fruit, and 782 hen eggs in one year. Average recent yield indicat over 12 tonnes/ha. These yields per ha are around four times commercial figures.

Zainuddin and Mercer (2014) report a Melbourne home garden producing fruit and vegetables at the rate of 4t/ha, plus 1015 eggs p.a.

Hume, Salomon and Cavagnaro, (2022) found that 23% of the average lawn area would be sufficient to produce the recommended vegetable intake for a family of 2.5. Of the properties studied, 93% had the room to a create such an area.

Leahy (2020, p. 235) reports a study finding that food production in and around small villages in Victoria could reduce land area required for food production for Melbourne by two-thirds

In Havana 90% of fruit and vegetables consumed are reported to be grown within the city. (Williams, 2018.) FAO (2022) reports Cuban urban small farms, cooperatives and home gardens, totalling 93,000 ha, are reported to produce an average of 3 t/ha/pa of vegetables, fruit and root crops, along with 10.5 million litres of cow, buffalo and goat milk and 1,700 tonnes of meat”.

A study of Sheffield (Edmondson, 2020) found that there is more than enough urban land available within the city to meet the fruit and vegetable requirements of its population.

Watson (2015) refers to the “Victory Gardens” planted by ordinary people in England during World War 2 achieved on average 10 times the typical agricultural yield.

Jevons' well known account of how prolific home gardening can be (...ninth edition 2017) shows that yields can be 10 times those of commercial agriculture, with comparable labour and other inputs. He says a complete vegetarian diet for a couple could be derived from 300 m^2.

Blazey (1988) says 254 kg of fruit and vegetables can be produced from 110 m^2 for one person, equal to about 1/7 of a house block. He claims that urban gardening can be in the region of one thousand times as productive use of land for beef production.

These studies would seem to constitute an impressive indicative case that home and cooperative gardening is capable of achieving impressive yields. In some cases information on labour input suggest that these are not excessive. Again these a achievements by isolated non-professional recreational gardeners.

Note that several cases go beyond reporting aggregate kg yields to detail types of foods including meat, (i.e., eggs and protein.) There is no reference in the above cases to the potential of backyard small tank fish production, which takes negligible space, enables recycling of nutrients and provision of nutrient rich water for aquaculture, and can have high protein yields. (See below.) Future research should attend to this composition issue, that is, the provision of sufficient quantities of different kinds of foods. This is one consideration which leads Smaje (2020) to advocate small farm inclusion of rough lands for pig production. His analysis for the UK details provision of various food types, not just kg yields. The Simpler Way vision assumes village supply of grain and dairy products from nearby small farms.

Reasons why these figures are misleadingly low.

There are a number of reasons why the foregoing evidence Is likely to significantly underestimates the potential of urban agriculture. Most of it refers only to household property. In most settlements an area that might be match larger is currently available but not used for food production. This includes "nature strips" between the road and front fence, other roadside land, walls and rooftops, land beside railways, and parks and playing fields. More importantly, in the transformed landscape to be discussed below there would also be much land freed by digging up the many suburban roads that only get vehicles out for the drive to work each day. In that localised and highly self-sufficient landscape there would be little need for associated infrastructures including home garages, parking lots, through roads and freeways, petrol stations, car sales yards, and premises dealing with vehicle servicing and repairs, let alone freeways. There would also be savings in many other traffic and transport costs, vehicle production, policing and legal costs, road accidents and associated medical costs avoided.

Another large area in almost all house blocks is that devoted to lawn. Levenston (2022) reports a study finding that only 23% of household lawn area in Adelaide could provide sufficient vegetables for the family. Brown (2022) says that if the space occupied by American lawns was converted to food gardens, the country could produce four times as many fruits and vegetables as it does now. She says in the United States there are 40 million acres of lawn and lawns are the single largest irrigated "crop" in the U.S. "Lawns are the most destructive monoculture on the planet, absorbing more resources and pesticides than any other crop. Vegetable gardens use 66% less water than lawns." "According to the EPA, close to 80 million U.S. households spray 90 million pounds of pesticides and herbicides on their lawns each year. A 1999 study by the United States Geological Survey found that 99% of urban water streams contain pesticides..." "The Environmental Protection Agency estimates that this equipment is responsible for 5% of U.S. air pollution. Americans use about 800 million gallons of gasoline per year just mowing their lawns." Hume, Salomon, and Cavagnaro, (2022) found that 30% to 60% of residential water is used for watering lawns. In addition there is the cost of mowers, dumping grass cuttings, and fertilisers and pesticides, and of carbon emissions from these processes.

The above yield figures make no reference to fish. Any suburb can contain a large fishing industry based on use of tubs and small tanks in confined spaces. Devault (2023) discusses a small cooperative producing about 150 kg over six months from a 2000 gallon tank. Synaptoman, (2013) reports on an 18 square metre fish pond producing 150 kg of fish p.a., plus 1,300 kg of tomatoes from trays the water is circulated through. This is 1/555 of 1 ha for the fish, corresponding to 82 tonnes of fish per ha per year. (See also Schroeder and Serfling, 1989. See further below on use of urban ponds.)

Vertical walls, and rooftops are additional spaces not taken into account above that can be used for food production. There is a great deal of space in cities in the form of flat rooftops. Food can be grown on concrete, using tubs. Use of miniature fruit trees in pots can enable a much higher density than in the field, and reduce water demand. Vines can be planted at the foot of walls, enabling roots to use soil under floors and paths protected from evaporation, and can be trained up vertical surfaces. A Queensland Blue pumpkin can roam more than 20 metres, and most of it might not take up any soil area. Vines including Chokoes, grapes and climbing beans climb vigorously and provide shade in summer. Pots and tubs can be attached to sunny walls. Excess water can drip from each to those below.

The potential is likely to be reduced by the increasing density of urban areas and consequent shrinking of block sizes.

Commons,

Much space within an ideal settlement would be given to commons, that is land and facilities owned and managed by the community, including vegetable gardens, parks, pastures, orchards, road side apace, woodlots, ponds, sheds, clay pits, windmills, a few vehicles to borrow or hire, and the community centre containing a café, workshop, meeting space, craft rooms, library, art gallery, recycling racks, and tool library.

Manny urban railways take up land that is at least three times the necessary width. Much space not used for formal gardens and orchards etc. would be crammed with an "edible landscape" of fruit and nut trees, herbs, bamboo, and bush tucker. Most if not all the produce from commons would be free, although they would be paid for by contributions to working bees organised by the agriculture committee. These are common Permaculture principles, and are practised in many locations.

One of the products of the commons would be honey. Smith and Vidot (2016) report estimation of a remarkable possible yield of 200kg per ha in densely gardened suburbs. This would exceed demand. Hives could be privately maintained or managed by one of the agriculture sub-committees or leased to a small private firm.

Ponds on common land would produce a range of food, materials, and services, including rushes for baskets, seating and screens, bamboo, recreational fishing and fish, swimming and canoeing, and edible water plants such as water lilies and water chestnuts.

One of the most overlooked possible uses of the commons is for an urban fishing industry using sewage ponds. They can be used to trap nutrients in sludge or feed plant, fish and bird life. They can purify water for reuse via a long series of ponds in which plants and animals extract nutrients.

Since the 1890s Werribee farm outside Melbourne has absorbed city waste water in grasslands that were then drained and later grazed by sheep, over a two week cycle. (Melbourne Water, 2024.)_

Vansintjan (2021) reports that by 1995 40% of Hanoi's fish consumption came from such ponds. But the most impressive example was to be found in Calcutta's 12,000 ha of ponds taking in 80% of the city's sewage and providing 8,000 tons of fish per year to the city, or 40% of the region's fish production. Vansintjan refers to evidence that the nutrient value involved would have cost India $2 million a day to purchase as fertilizer.

The city of Munich made extensive use of these systems in the 1990s. Vansintjan says there is good evidence showing that sewage treatment in properly managed fish ponds can be as safe as conventional methods of fish production. He notes that a small sewage-fed fish pond can provide a family of six with 8kg of fish, per person, per year

Unfortunately in recent years use of these systems has faded, mainly due to loss of land to urban "development".

Good settlement design maximises collection and storage of water. Swales and bunds take run off to ponds and storm surges to above ground playing fields and parks where it can slowly soak in for surrounding fruit and nut trees. No underground pipes are needed, avoiding use of concrete and enabling easy access to any blockages.

Commons can be densely "stacked" with "edible landscapes" of productive plants providing free food and materials.

Small farms

The third component of the Simpler Way food supply vision is the small farm sector, located within the settlement and close by. The proximity enables return of nutrients to these soils, possibly transported by donkey carts on the return journey after taking produce to the town market place. (Donkeys find their own fuel, don't need grease and oil changes or spare parts, or assembly lines to produce, and provide leisure resources.)

On average food in the US travels 1,500 miles before it gets to the dinner table, packaging is required, and nutrients are lost in the process. (Brown 2022.) In the new sustainable localised landscape it would travel about 3 km at most, be fresh, and involve negligible processing or packaging.

This vision does not deny that depending on region and soil and climate conditions there might need to be longer distance transport of various produce from larger scale farms located in the best regions for their crops. Grains and dairy produce are among the few items that might best be produced outside the town.

In his book Small Farm Future Smaje (2020) details the case that these farms could feed Britain using around only 18% of the workforce. The need would be far less when the output of the above home and commons output is taken into account. He states that small farms can be as efficient in conventional terms as big farms. (p. 131.) Key also states this. (2019.)

Forgotten and overlooked possibilities.

Many non-Western societies produce food in ways that are likely to be capable of adding significantly to the above potential.

Consider a technology that provides eggs, poultry meat, feathers and fetiliser without any inputs of work, animal feed, care or water, while providing manure so rich that it was once used for producing gunpowder. The village dovecote was a structure containing many nests for doves located inside the walls of a small structure providing shelter. It was in wide use at least 400 years ago. (The Last Farm, 2024.)

In Oman arid similar regions traditional agroecological practices enable impressive yields. For example, alfalfa is harvested up to twelve times a year at 2 metric tons each time, a higher yield than is achieved in California today. (Kamnitzer, 2024.)

Pool (2014) draws attention to the contribution made by traditional local food gardens in Russia. These accounted for more than 40% of Russia's agricultural output. The gardens use around 3% arable land, and account for roughly 92% of all Russian potatoes, 87% of all fruit, 77% vegetables, and 59% all Russian meat.

The significance of localism; Small integrated settlements.

It is necessary to put this discussion into the general context of the global sustainability predicament. There is a strong case that a sustainable and just society can only be achieved by an enormous degrowth transition to some kind of "Simpler Way". (TSW 2024.) This conclusion derives from the voluminous "limits to growth" and "Planetary Boundaries " literature. Some background should be given here as this issue has crucial implications for urban agriculture.

Global rates of resource consumption and ecological impact are now far beyond levels that are sustainable, or that technical advance could make sustainable, or that could be spread to all the world's people. What needs to be stressed here is the magnitude of the overshoot. For instance the World Wildlife Fund's "Footprint" measure (2022) indicates that the amount of productive land required to meet the demand of the average Australian is around 6 ha. So if the 10 billion people likely by 2050 rose to our "living standards" we would need perhaps 60 billion ha …but there are only 12 billion ha of productive land on the planet. If we leave one-third of it for nature there would only be 0.8 ha per capita available. These numbers indicate that Australian's today are using over 7 times the per capita amounts that would be possible for all to use in 2050.

There are a number of reasons why the multiple and the required reduction would be significantly worse than this, including the decline in mineral grades, biodiversity loss rates, soil damage, chemical toxicity levels, etc. The "Planetary Boundaries" measures indicate that sustainable limits for 6 of the main 9 boundaries have been exceeded. Yet there is universal commitment to continual and limitless growth in production, consumption and GNP. Global materials use is growing at 2.3% p.a. (UNEP 2024) and is likely to double by late this century.

The common argument against this limits to growth analysis of our situation is that growth of GDP can continue because it can be "decoupled" from resource demand an environmental impact. This faith is contradicted by much recent evidence. The lengthy reviews by Hickel and Kallis (2019), Parrique et al., (2019) (300 studies reviewed), and Haberl et al. (2020) (800 studies) conclude unambiguously that despite constant effort to increase efficiency and cut costs absolute de-coupling of resource use and environmental impact from GDP growth is not occurring, and that it is most unlikely to be achieved in future. In fact the trends are getting worse. For instance a 1% increase in world GDP (measured in PPP) is now accompanied by a 1.9% increase in metal consumption. (Lenzen et al. 2022, Zhang 2018.)

The Simpler way argument is that the enormous reduction in production, consumption, resource use and GDP required to achieve anything like a sustainable and just situation can only be achieved if there is an enormous degrowth transition to a very different kind of social system. (TSW 2024.) It must involve most people living in small, highly self-sufficient, self-governing and cooperative communities, in control of their local zero-growth and needs-based economies which are not driven by profit or market forces, and in which people are willing to live very frugally. This is illustrated by a study of egg supply (Trainer, Malik and Lenzen, 2019) which found that the dollar and energy costs of those delivered via conventional supermarket path were in the order of 50 to 200 times those coming from backyards and local cooperatives.

The explanation for such dramatic reductions is in terms of the smallness of scale, proximity of functions, and integration of communities which enable the elimination of many costly inputs, the reuse of "wastes", and "administration" via spontaneous and informal social interactions. The typical supermarket egg has a vast and complex global input supply chain involving fishing fleets, agribusiness, steel mills, coal mining, power stations, shipping and trucking transport, silos, warehousing, chemicals, infrastructures, supermarkets, storage, packaging, marketing, finance, advertising and insurance industries, waste removal and dumping, computers, a commuting workforce, and highly trained managers and technicians. It also involves damage to ecosystems, especially via emissions and agribusiness effects including non-return of nutrients to soils.

However eggs supplied via integrated village cooperatives can avoid almost all of these costs, while enabling immediate use of all "wastes". Recycling of kitchen scraps along with free ranging can meet total poultry nutrient needs. Poultry and other animal manures, including human, can be directly fed into compost heaps, methane digesters, algae and fish ponds, thereby eliminating the need for inputs to village food production from the fertilizer industry. The supermarket path prevents nutrients being returned to distant soils. Integrated local systems enable closed circle loops whereby nutrients circulate from gardens through kitchens and animal pens and back to soils. Thus no sewer systems are needed. No transport for worker commuting need be involved, other than bicycles. Small amounts of co-products from localised mini-industries can be easily moved to nearby users, such as carpentry off-cuts, animal skins, wool trimmings and saw dust. Management, care and maintenance of systems can be largely informal, via spontaneous discussion and action, although there would be many committees. No dollar labour costs or paid officials need be involved. In addition cooperative care of animals adds to amenity and leisure resources and facilitates community bonding.

These concepts can apply to many other domains, including almost all other food items, dwelling construction, clothing supply, carpentry, repairs, many services, and especially to provision for leisure, entertainment and education. Following are some of the additional food production ways that are made possible in settlement of this kind, discussed at length in Permaculture and related literature. (Holmgren 2017, Alexander and Gleeson 2018, Leahy 2009, 2020, 2022, Nelson and Edwards 2020.)

Proximity and smallness of scale facilitate multiple and overlapping functions. For instance woodlots provide shade, fruit, honey, timber, windbreaks, foraging and amenity. Manures become fertilizers. Ducks eliminate snails, fertilise ponds and produce ducklings and entertainment. Bee hives improve pollination as well as provide honey and wax, and an interesting hobby. Trucking of hives to remote orchards is not necessary. Fish ponds provide nutrient-rich water for aquaculture. Chickens roosting in greenhouses overnight raise carbon dioxide levels. Many systems can be designed to maintain themselves and eliminate work, for instance geese, sheep and goats can keep grasses down in the firebreak areas. Poultry can clear old garden sites while fertilizing for the next crop. Poultry foraging in the orchards can clean up fruit fly lavae in fallen fruit. Goats can keep blackberry vines under control. Factory farming (at times confining chickens to an area the size of an A4 sheet of paper) would cease to exist. Multiple cropping would be practised. Wheat is usually planted only once a year but urban agriculture enables new vegetable seeds to be planted as soon as a patch is cleared. Some commercial compost producers use flocks of chickens to turn their heaps rather than tractors, avoiding fuel use while dining poultry produce at minimal chicken food cost.

Some other elements.

Following are additional principles and practices within alternative agriculture.

Soil fertility can be enhanced in difficult locations by use of deep rooted plants such as Comfrey to bring up minerals, and by digging in rough biomass, including large logs. (Hugelkultur 2024.) Hedges can be animal fences, providing berries etc. and habitats for birds that hunt pests. Drystone walling consumes no steel or cement resources while clearing ground. Earth, the best building material, can construct domes and vaults for warm animal shelter (and housing for people) which eliminate the need for roofing timber, tiles or corrugated iron.

Wool plus knitting needles can provide resource-costless jumpers that last decades. Rushes, flax and vines growing in the “edible landscapes” on the commons can be used for baskets, mats and seating. Bamboos have numerous uses, from housing, scaffolding, fencing, furniture, fibres, mulch and food. Clumps last for long time and need little maintenance. Animals can provide leather, tanned using local wattle bark.

These materials can flow into many tiny craft and hobby businesses meeting local needs, such as leather work, preserves, carpentry, pottery, dressmaking, slippers and other footwear, cosmetics and chemicals such as dyes, paints and adhesives. These ventures guarantee diverse and rich townscapes full of interesting skills and workshops to visit.

Food forests can be planted to contain a wide variety of plants including fruit, nut and timber trees. Many common “weeds” within them can provide prolific “bush tucker”, such as New. Zealand spinach. Invasive plants such as Kikuyu and Blackberry can be fenced in rows enabling goats to contain them. Many fruit and nut trees and herbs would grow in the parks and beside the roads.

Eating local fruits and vegetables only when in season can eliminate the need for canning, preservatives, freezing and transporting, and add to appreciation of the delights of seasonal change. Imperfect vegetables can be used. Flanders (2017) estimates that in Belgium at least 10% of fruit and vegetables produced are not marketed because of “cosmetic” factors. The EU even stipulated the degree of bend in bananas among these factors; they had to be “free from abnormal curvature”. (Worstall 2016.)

Related is the remarkable amount of food wasted, in Australia equivalent to about 60% of the weight of food eaten. (Clean Up Australia 2024.) In addition there is waste due to erratic market phenomena such as gluts leading to dumping, delays due to disruptions to global transport, bulldozing orchards no longer able to compete with imports, (...$30 million cost of ripping out grape vines in Australia announced 10.5.2024; ABC 2024a), and supermarkets throwing out food to dumpsters. (Thousands of tonnes from one chain in Australia in 2023. ABC 2024b.) None of these factors would be evident in a community with a vigilant agriculture committee.

Food travelling short distances fresh from gardens eliminates most of the need for storage and especially refrigeration. Root crops can store in the ground until needed. Mud brick cool rooms and storage in sand can keep various fruits and vegetables for long periods. Drying and bottling can be domestic hobbies. The neigbourhood might need only a few community fridges and freezers in the community centre.

Related is the avoidance of pesticide residues in food, and traces of chemicals used to preserve and package foods. Alternative agriculture can avoid these, especially by avoiding large scale monocultures in which pests can spread easily. Local agriculture involves mostly small patches integrated into complex landscapes in which there are many species ready to deal with pests.

Seed saving and sharing can eliminate the need for purchasing seeds, while facilitating selection of varieties most suited to the locality.

Small digester tubs in backyards taking kitchen scraps etc. can provide significant quantities of methane for cooking. Alexander reports that an input of roughly 1.5 kg per day into his system generates sufficient gas for around 38 minutes of cooking gas each day. He says this is more than enough to allow households to disconnect from fossil gas supply. (Alexander and Gleeson, 2018, p. 125.)

The local agriculture committee would organise research and trials to gradually work out the most pest resistant, tasty and prolific varieties suited to their region. Much of the activity of the community working bees would go into agricultural tasks, such as pruning the fruit trees in the parks. They can organise a working party to "Permaculture blitz" a new patch to quickly get it into good shape.

The large number of keen home gardeners would be keeping a wide range of plant varieties going. The loss of varieties is a major concern as agribusiness is only interested in the few that maximise income. (Wilson 2013 estimates a 93% loss of food variety in 80 years.) The loss of taste and nutritional value evident in the currently tasteless tomato would not occur. Roberts (2017) reports USDA studies showing a steady decline in nutritional quality in commercial fruits and vegetables since around 1950. Bhardwaj, Parashar and Parewa, (2024), also stress the loss of nutritional value that has occurred in commercial agriculture. This is not a factor that agribusiness producers have much incentive to attend to.

A geography involving many small plantings, little storage and minimal transport is not prone to the spread of diseases. Problems tend to be rapidly identified. Nearby hedges and forests enable birds to deal with pests. Pesticide use could probably be entirely eliminated.

Agribusiness inflicts harm on large numbers of animals, including pigs confined in very small pens, sheep and cattle dying on live export sea voyages, and chickens legally limited to the area of an A4 sheet of paper. Local systems typically enable free ranging.

Conventional food supply involves large numbers of expensive highly trained people with degrees, sitting at computer screens, with expertise in finance, personal relations, management, OH & S, logistics, engineering, bio-chemistry, insurance, law etc. Home gardening and cooperatives avoid almost all of these costs while enabling ordinary people to be excellent food producers. The agriculture committee would organise field days, visits and educational activities, and update the community on new developments.

Agribusiness also involves a great deal of borrowed capital and thus interest payments at all levels. Costs at one level include interest payments at all the previous level, adding to perhaps 40% of the price paid by consumers. (Kennedy, 2010.) Local agriculture often involves no use of money let alone any borrowing of capital.

Above all are the energy implications. These alternative ways involve very low non - renewable energy inputs, many of them in the form of human exercise. There is very little use of machinery, transport, refrigeration etc. Small farms might share a few small tractors running on local biofuels.

Again, easily overlooked is the fact that conventional food production is the result of a long history and vast R and D effort whereas almost none has gone into the alternatives being discussed. In the kind of settlements sketched above agriculture would be guided by intensive research into techniques and varieties, advisory and educational services, degree-level courses, demonstration farms etc. Some of this would focus on the practices most suited to local conditions and some would be bringing global advances to the community.

These benefits of small scale local agriculture are of most significance for poor countries. Leahy (2009) documents the futility of African governments goading impoverished farmers to compete harder in the global market place to increase export income, when they could be enjoying secure lives via policies aimed at enabling cooperative village self-sufficiency. He describes the Chikukwa project concerned to establish these kinds of alternatives. Gandhi saw the wisdom of this village-based development strategy long ago. Large numbers of Indian farmers trapped in conventional “development” policies commit suicide every year. (For a critique of conventional “development” theory and practice see Trainer 2024.)

Social and ecological considerations.

There are important social welfare benefits associated with local agriculture. It helps to make urban geographies more convivial, cohesive, resilient and leisure-rich. Many people find pottering in the garden to be a major source of relaxation and well-being. Aged care facilities located close to gardens enable older people to observe and participate in gardening and animal care. The Homeless Garden project (2010) demonstrates the therapeutic power of community gardens for people recovering from trauma.

Agribusiness is not only not conducive to thriving rural life, it has a strong tendency destroy it. Large corporations using elaborate machinery need few low skilled and low paid workers, and “Economies of Scale” drive out small farmers and weaken small farming communities. ADD and

Then there are the implications for national security. Conventional food supply chains lack the resilience and redundancy that provide security. They are vulnerable to major disruptions and uncertainties. The system is fragile and insecure. Supply can be cut by transport failures, warfare, trade disputes, financial collapses, environmental disasters and epidemics far away. Prices can suddenly rise to unaffordable levels. Just-in-time deliveries mean that supermarket shelves could be bare in three days. Increasing global materials and energy scarcities are likely to impact severely on costs and prices within the resource-intensive conventional food supply system. There is serious concern with rising food prices and there are now estimates that 30% of Australians are finding it difficult to afford sufficient food.

Highly self-sufficient local economies are free from all these concerns. Towns can always have crops in the ground within and around them, and bins of grain and dried fruits stored in cool rooms and poultry in their paddocks. And they can have the networks of familiarity, redundant skills, trust and care that will ensure that difficulties will be quickly dealt with to provide for all cooperatively. Banking collapses or runaway inflation need not jeopardise the capacity of their citizens to get access to necessities.

Consider also the implications for democracy. In conventional society most people have no direct control over their fate. Decisions are made by distant politicians and bureaucrats and imposed. One man can decide to commit a nation to war. However in the communities envisaged, citizens have the skills, resources and structures that enable them to take control of their immediate situation. Their fate depends on rational, cooperative face to face deliberations involving small numbers. That is, they practise participatory democracy, and this was in rewards conscientious citizenship, solidarity, morale, pride, and empowerment

The disadvantages of conventional agribusiness.

Mainstream provision of produce from the land is remarkably prolific and, at least in rich countries, and low cost in dollar terms. However there's an extensive literature claiming that it is seriously flawed and not sustainable. This is mainly because its disadvantages have been “externalised”, that is, not included in conventional cost benefit accounting. Following is a brief list of such factors.

- Very high energy costs of production, now contributing 10 to 20% of global carbon emissions. Ritchie (2012) estimates over 30%.
- In addition energy and dollar costs of machinery infrastructures, processing, packaging transport, marketing, and waste removal.
- Dependence on fossil fuels for fertilizer production, without which global food production would be far lower
- Well-described as “soil mining”, as nutrients cannot be returned to the distant soils that produced them, so must be dumped generating further costs and ecological impacts.
- This contributes to biological imbalances and pollution problems, such as eutrophication of rivers, lakes and seas, especially due to excessive nitrogen runoff
- Depletion of biological resource stocks, notably via overfishing, land clearing, water demand and soil destructive effects. These contribute to regional and

international tensions for example over access to glacial flows from the Tibetan plateau.

- Long term major depletion in soil quality, including reduction in carbon levels, acidification of soils, salinity increases, erosion losses, soil compaction due to use of heavy machinery. The general increase in soil chemical toxicity is one of the Planetary Boundaries of concern.

- Farmonaught, (2025) is among many sources warning that these factors will seriously deplete food supply by 2050.

- Continued large scale clearing of native vegetation for agricultural production, and logging of native forests. These are the major factors causing loss of biodiversity. Australia is possibly the worlds worst offender.

- Continuing unsustainable water withdrawals, for example from the Australian Murray-Darling system.

- Unacceptable conditions for many animals notably poultry, pigs, and live animal exports.

- Connections between the production and retailing sectors are producing record profits for the latter, in Australia dominated by two corporations, while there is widespread struggle with a cost of living crisis with many now unable to afford sufficient food.

- Significant costs due to middlemen operating between farmers and consumers. The US Dept of Agriculture (2025) estimates that only 16% of the retail price of food goes to the farmer. Local agriculture involves few functions between farmer and consumer.

- Loss of taste and nutrient values, incentivised by priority given to marketing characteristics, e.g., toughness for transport and long shelf life.

- Often undue power of corporations over governments, for instance inhibiting appropriate action on the Murray-Darling water allocation problem, or on food retailing profits in times of severe hardship for many.

- The depletion of country life and country towns, as big farms replace small farms.

Localised alternative agriculture can avoid all these effects especially when practised within zero-growth economies. Conventional agriculture can appear to be impressive when usually hidden costs are overlooked. Conventional economic accounting only attends to dollar costs and classifies many other high social and economic costs as “externalities”. The combined actual but hidden impact of the above list of disadvantages on national budgets and welfare must be huge.

The need for research

Clearly much more research on these issues is needed, especially studies which classify projects according to indicators of their particular character. For instance how experienced are practitioners, how well resourced, site conditions, time inputs, resource inputs, records on yield types and quantities, performance of backyards versus cooperatives, dollar costs for various inputs, ecological impact, areas where subsidies would make a significant difference. Inspiring example projects need to be documented and publicised. Research into public and official attitudes to alternative practises is also important, indicating what strategies might be most effective.

Conclusions.

The Hauser et al. study was confined to one factor, the carbon emissions generated by urban agriculture. Even if its unfavourable findings are valid this would be a highly misleading indicator of the merits and potential of the approach. When all relevant cost and benefit factors are taken into account there would seem to be little doubt that the range of alternative sources of food and materials production considered in this article indicate an approach that is clearly superior to conventional agribusiness on most if not all considerations.

The ultimate question is how likely are these alternative practises to be taken up. At present the answer must be, not very. There is little incentive for most people struggling with busy lives and unfavourable conditions, with easy access to well-stacked supermarket shelves. There is relatively little public interest in family or cooperative food self sufficiency. Governments will not and cannot implement simple ways; they have no choice but to promote constant growth via existing systems. Widespread adoption of the above practises would require widespread acceptance ofa very different culture in the minds of people in general.

But simpler why transition theory is based on the conviction that present social conditions will undergo profound change before long. We are soon likely to enter a period of major global breakdown, primarily led by financial collapse building on the many worsening limits to growth trends. States will be Increasingly unable to provide so people will be forced by circumstances to turn towards local, cooperative, self-sufficient, frugal alternative ways. The chances of a smooth and pleasant transition are clearly not good, but working to increase the numbers who will try to achieve it has to be the focal strategy now. The foregoing discussion has endeavoured to show that within the food and agriculture domain there are many desirable and workable options.

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