**Some Thoughts on the SFS Draft V0 on Towards a Common Understanding of Sustainable Food Systems**

Introductory Remarks:

This discussion does not undertake the following:

• Discuss the environmental, social or other ills that result from the inappropriate use of food systems.

• Evaluate diverse methods used within any sub-system of a food system with a view to recommend any one of them.

• Provide examples of successful projects used to achieve the output of any one of such sub-systems.

• Claim that any sub-system of a food system represents the whole.

What it attempts to do:

• Suggest a holistic outline of a food system developed through an evolutionary approach that mirrors human development.

• Illustrate how commercialization of each sub-system of a food system has hidden its actual structure and purpose.

• Demonstrate that the value of a food system justifiably derives only from the fact that food is the third vital thing after air and water for the sustenance of our life.

• Hint at changing the justifiable purpose of a food system from financial gain which has brought about many undesirable consequences, to enabling all of us to procure adequate and balanced nutrition.

Even though it may not be essential to mention this specifically, an adequate understanding of what may justifiably constitute a food system requires us to apprehend an important logical distinction, viz., its structure and use. Of course, this is obvious, but most of the literature I have seen appears to regard this distinction as a trivial point.

Consider the following case: A perfectly equipped school with well-qualified teachers, eager pupils, where nobody moves or speaks. We may have got all the ‘hardware’ of the system in place, but what good does it do? Nothing but waste. This illustrates my point, a food system taken as an ‘object’ in isolation can hardly throw any light on the issues we try to illuminate any more than the above school could tell us something worthwhile about an education system.

So, what is the way forward to an understanding what we may justifiably call a food system? Though it may seem unusual, this is precisely my point of departure, an uncomfortable question. Let me give a hint. Scientific methods of analysis may seem prestigious and the right way, but their use is logically limited to what are called objects subject to gnomic laws, i.e., laws governing the behavior of non-living things where we cannot talk about their behavior as ‘goal-directed. Their behavior is governed by the laws of chemistry and physics.

One more hint; unless force or some other forms of compulsion is used people would not farm, fish, or cook unless doing so serves their interests. Obviously, the early man found this practice to be highly desirable, because it gives him an easier and more reliable supply of food with greater ease, hence it serves one of his major interests, viz., and nutrition. Nobody would dispute that after air and water, food is the third most important hence valuable thing for all of us. Unless we have food, there would be no living for man or beast. This is the sole justifiable reason a rational being could attribute a value to food, and thence to activities essential for its production and passage to the end-user.

Therefore, it is untenable to speak of those putative value chains or an approaches to FSN based on them. This is not to advocate an equally untenable idea of a trader just collecting and distributing food to the end-users and hope for a tip as a reward. The point is that the value of food cannot be based on economy as it is understood and practiced. Let us never forget food was produced and consumed long before any notion of modern economy emerged. We will fail to understand the nature of a food system unless we are able and willing to forget the ‘value chain approach’ and look at it with open minds.

Towards a justifiable notion of a food system:

What does one mean by ‘justifiable’ here? It is quite simple; when our description of what we consider to be a food system meets certain essential requirements, it becomes a justifiable description of it. This begs the question, what are those essential requirements? This implies that the justifiability of such a description could occupy a place in a spectrum ranging from completely justified to being partially so. Therefore, we ought to strive to arrive at a completely justified description of a food system.

One more clarification; a food system is justified if and when its use enables the people the purpose its application is intended to serve. We all know what this is viz., enabling them to procure regularly adequate quantities of wholesome food at affordable cost so that they may enjoy a varied and balanced diet in a sustainable fashion.

Thus a justifiable food system will ensure the following:

I. It is sustainable so that it could serve its purpose regularly, and it would be resilient enough to deal with a wide variety of adverse natural and man-made events.

II. Its food out put would be available to the end-users.

III. It will yield affordable food stuffs.

IV. Its yield will be varied and wholesome and would contribute to appropriate nutrition and dietary enjoyment.

Now, it is time to look at the features a food system should meet to embody the four criteria of its justifiability. Once we have achieved this objective, it would be of immense help towards achieving a global FSN as the draft so aptly puts it.

Attributes of a justifiable food system:

As I have mentioned earlier, a description of that ‘passive’ school could hardly serve as that of an education system or even a part of it. It could be of course, but such efforts which are very common today overlook the describer’s prior knowledge that teachers are generally teaching and the pupils are learning. This is a crucial point, viz.; we recognize any system by certain actions performed by some people actually using it.

Why should they use it? A food system like any other is used, because its users believe that their use of it would enable them to achieve something desirable, and in this case get food in a more convenient way. These actions can be placed in logically linked groups relative to some step towards a given overall objective, viz., getting food. Put differently, a system in use instantiates the use of several sub-systems which may contain actions shared by more than one sub-system. For instance, individual physical movements by people to do different things are common to all sub-systems, and the sub-systems are used in the same way. For example, a subsistence farmer uses a simple transport system when clearing his fields, planting seeds, harvesting and carrying the lot home.

Apologies for jumping the gun a little, but it is necessary to do it here to ensure a continued description of the requirements of justifiability which cut across the board. Let me begin with some self-evident facts beyond dispute:

• All animals including man need food, and they obtain it by being herbivores, carnivores or like man, being omnivores.

• Except in some sedentary species specially adapted to their environment, food has to be procured by some effort on their part. Early man did not differ very much in this from the other omnivores. Their common food system consisted of a search for food and harvesting it from their environment by hunting, fishing or gathering and its consumption on procurement.

•Our intellectual evolution is simultaneous with the emergence of social groups, for tools essential for the generation and expansion of our knowledge and skills depends on the possibility of passing it on to the next generation. This is impossible without social cooperation out of which shared social practices could emerge.

• One of the first such practices seems to be taking the procured food to a shared location where archaeological evidence of charred bones shows some animal food has been cooked.

•Now, it is possible to identify three component sub-systems in our primitive food system viz., searching for food with view to hunt, fish or gather it, in other words, harvesting it directly from the environment, transporting it ‘home’ and preparation prior to consumption. How long we used this simple system cannot be ascertained.

• The next important evolution in our food system seems to be a two-pronged development where some social groups settled down into a primarily agricultural mode of life, while others, principally owing to their environment, evolved a nomadic way of life. However, they have never been mutually exclusive, and must be seen as a question of degree.

•Thus, cultivation and animal husbandry gradually supplanted the hunter-gatherer food system in a majority of social groups. It would be ignoring the reality as it is, if we overlook the well-established anthropological fact that many hunter-gatherer communities survived in the world as recently as 100 years ago in Asia, Australia, South America, etc.

• Agriculture and animal husbandry added a new component to our primitive food system viz., a real food production system whose produce could be much more easily harvested and whose yield could provide one with a food surplus.

• Availability of surplus food intensified man’s efforts to preserve food for future use in more systematic ways. Anthropological evidence shows that even the hunter-gatherers developed some preserving systems like smoking the surplus meat, or preserving it in hollows of trees and fill them with wild honey (Veddas of Ceylon). In order to keep food for future use, adequate storage systems have to be developed. While the old cereal storage systems are still in use in some parts of the world, the giant grain silos and refrigerated storage facilities represent their technically advanced counterparts.

• The new food security agriculture afforded man more time to devote himself to the quality of what he ate. It is reasonable to suppose that the motivation for cooking could well have been the improvement of taste and flavour of the food it could bring forth.

• This introduced a new justification for eating viz., what may be called dietary enjoyment while it was previously only concerned with appeasing one’s hunger. Please recall that at this point in our history, man had no idea about balanced diets or its health implications.

• In a considerable number of social groups, dietary enjoyment seems to have received considerable attention which resulted in the development of sophisticated cookery in countries where such social groups could influence cooking.

• Other things being equal, food production depends on the availability of adequate ecosystems services. Those include the availability of water and mineral nutrients, salubriousness of the climate, soil texture, etc. Continued adequate availability of those services depends on the equilibrium between their use by the living and their return to the environment. In addition to the natural water cycle and a part of the nitrogen cycle (lightning), the bulk of this exchange is driven by the birth and death cycle common to the living.

• But the adequacy of the contribution the birth and death cycle makes to the above equilibrium depends on the qualitative and the quantitative dimensions of the living. The former indicates the bio-diversity among them, while the latter represents the optimal population of each species. Thus, the possibility of the first equilibrium depends on the second equilibrium between bio-diversity among, and the populations of the species endemic to an area.

• Repeated cultivation or continued grazing in a given area would soon bring about a distortion of this second equilibrium reducing one or more of ecosystems services on which agriculture depends.

• Existence of slash and burn agriculture, use of wood ash from homes, and later on application of animal manure indicate man’s pre-scientific awareness of loss of soil fertility due to continued suppression of original bio-diversity and population balance, and his response to it. This response represents the use of a limited supplementation of the lost ecosystems services and may be called the supplementation system. In nomadic societies, migration of people and their animals following the seasons served this purpose, for it allowed the grasslands to lie fallow long enough for their regeneration.

• Our potential ability to acquire knowledge and skills shows a wide variation with respect to the field in which they may successfully engage. While some have ‘green thumbs’, the others might revel in abstruse mathematics but will be incapable of keeping a potted plant alive. This awareness seems to have dawned upon man quite early, for it appears to have motivated the second most important development in our social evolution viz., division of labour. Social cooperation enabled man to find a use for division of labour that would make his life considerably easier.

• In its fairest form, it involved a person belonging to a social group to engage in activities useful to all, but in which he excelled, and could exchange his productions with others for something he needed but could not produce himself, and thus emerged the barter system.

• At least in the beginning, justifiability of the barter system seems to have been observed. Otherwise, it would have become unpopular, and then extinct. Its justifiability rested on the barter system remaining an exchange of commensurable values. However, human nature being what it is, it would be naïve to believe cheating took a long time to enter into the pastoral picture. But its lack of modern sophistication and use of casuistry may have made its unfairness somewhat more tolerable.

• Before we go on, let us recap the components of a food system we have identified as they gradually emerge out of the continuing human social evolution. Environment which was the sole source of food has been partially replaced by agriculture as defined by the FAO (fishing is still a part of the environment in use). This may be called the food production system. Agriculture made possible an improved preparation/culinary system, created the need for better harvesting, storage, transport and preservation sub-systems. An early supplementation system has also emerged which would later expand enormously. Although exchange of food for other items or services doubtless motivated the creation of barter system, it is vital to understand that its emergence is a secondary phenomenon.

• The perceptive would have note at this point that much of the elements now presented as ‘new discoveries’ or modern’ have been with us for millennia. It is time we clearly distinguished between technical advances within a sub-system and the purpose of the whole that remains unchanged as long as man needs food.

• The next crucial development that affected the food systems in a mixture of positive and negative ways is another product of our social evolution viz., invention of the monetary system. Let me emphasise that its negative effects are not something inherent in it, but rather our misuse of a system for unfair profit.

• Invention of money enabled man to introduce an intermediary step into the barter system. One could sell say a farm implement or a domestic tool for money and then buy food, or the farmer could sell food and buy the tools he needed later on. This is much less cumbersome and made the exchange of goods and services using an intermediary viz., money, which is far more convenient and easy.

• Our search for greater personal convenience seems to have branched out with great rapidity on the wake of this latest invention. It is difficult to ascertain the evolution of trade, nor is it of great importance. What matters is that very soon provision of food as well as so many other goods and services was taken over by a new class viz., traders who did not produce or provide those themselves.

• Cutting out the jargon, their work is concerned with buying goods or the services from those who actually supply them and sell it to the end-users making a profit by the transaction or exchange. When carried out fairly, there is no doubt that the trader should be rewarded for his services. Thus emerged the selling system associated with food systems, which owing to its huge influence, unfortunately clouds our understanding a food system as a whole in an objective and a justifiable manner.

• Association of selling system with food systems have led to many undesirable results which have received scant attention of the mainstream describers of food system. Let me forcefully underline that system is a socio-cultural artifact and this ontogeny does not lend it to any theorizing, for such artifacts are Structured and used according to social norms.

• Before I comment on those undesirable results, the time has now come to mention another system that has become associated with food systems i.e., health system. First, let us recall that there are still some medical doctors who simply dismiss the notion of balanced diet in Europe and in Americas. I use their attitude only to emphasise that our association of food with good health is rather recent. One does not know how many tens of thousands of sailors on board sailing ships were crippled for life by Scurvy caused by the lack of Vitamin C etc. But fairness also compels us to remember that as death rates were high in the past and populations were smaller and land more fertile so that rural populations least influenced by trade had access to better nutrition than one would suppose.

• Let us now look at the purpose of nutrition; it serves two basic functions. First, it is necessary for growth and renewal of tissues. Secondly, it is catabolised to obtain energy for the tasks our bodies have to perform.

• Now, obviously our intake of food should be sufficient to meet our metabolic needs which will vary according to a wide variety of factors at any given period of a person’s life. Let us recall we are not machines doing exactly the same thing all the time. Thus, there is no objective scientific basis for prescribing a diet in terms of fixed number of calories and grammes of chemical content for any being human or animal as some seem to think. The best we may do is to offer flexible guidelines on good dietary habits, and most importantly, enable to people to acquire a sufficient dietary competence.

• Dietary competence represents the knowledge of the food best suited for oneself with respect to one’s age, sex, work/level of physical activity, local climate, local food culture, and not the least one’s own dietary enjoyment. Moreover, it also includes how and where to obtain such food and the skill needed to prepare it when necessary.

• When one does not possess the relevant dietary competence or is unable to apply it owing to the appropriate food being not available or affordable, two adverse results may ensue. These would also result from an inadequate dietary competence or when it is suppressed by an advertisement-induced desire to consume unhealthy food even when appropriate food is available and affordable as it often encountered in affluent societies.

• The first undesirable result involves insufficient intake of some nutrients bringing about a wide variety of deficiency diseases, stunted growth and cognitive abilities, etc. The second represents an excessive intake of some nutrients resulting in obesity and related problems that trigger NCD’s. It must be borne in mind that this awareness is quite recent when we recall that food systems have been with us for millennia.

• Thus, the availability of a varied, wholesome balanced diet at an affordable cost will by definition ensure good health. It is difficult to see how a public health approach could be of any use in achieving our objective. Medical authorities could play a key role in publicizing and banning food stuffs that fall into the following categories:

A. Food sold as main meals or snacks containing injurious additives, large amounts of sugar, fat, oil, etc., in them.

B. Regular and rigourous check to ascertain that every kind of food processing, storage and outlet conforms to high standards of hygiene.

C. Display a real dedication to the dictum “precaution is better than cure” by requiring stringent long-term testing on food produced by ‘state of the art’ or ‘cutting edge’ methods of food production before it is allowed to be produced and sold.

D. Actively disseminate information on healthy eating habits, and the health hazards posed by some edible items and beverages on sale.

• As the aim of a sustainable food system is to provide a diet described above, inclusion of a sustainable diet as a separate item is redundant.

Commercialization and the lateral expansion of food systems:

I will begin with a few clarifying remarks; unlike when it was in its ‘pristine’ state, a few lateral sub-systems have been grafted onto it during the course of centuries. We have already talked about the supplementation and selling systems. Indeed, the latter began to pervade all the other systems, which made it very difficult to identify it as a means devised to enable us to meet a universal need, especially in a world where ‘economy’ seems to be thought as the master and man as its humble servant. I have outlined the evolution of our food systems and even though preferable to revolution, evolution too could give birth to highly undesirable results. Fortunately, food system is a human invention, and it is certainly in our power to prune its deleterious off shoots so that the healthy trunk may grow. Just before the 2nd World War, great many learned helplessly claimed, “you can’t uninvent the evil of cannons”, but there is nobody in the modern world who could build again 16” naval artillery! Knowledge and tools are gone! Pyramids are there, but is there anybody who could make another? Genie could be bottled again if we just have the will.

• The first sub-system to be commercialized is the harvesting or procurement system. From now on, I shall use the latter term because most of us have to purchase food instead of harvesting it for personal use. Thus, a greater part of the output from a harvesting system will be purchased by an intermediary who in tern will directly or indirectly sell it to an end-user. This does not exclude the producer from selling the harvested produce himself as it is still done and is highly sought after. Competition among sellers in buying agricultural produce and selling it, has become a mere symbol owing to the proliferation of multinational food ‘giants’ and their national imitations. This has rendered the small holder bankrupt in affluent countries leading to the creation of huge factory farms where wide-spread capital-intensive monoculture has become the norm. The adverse effects of this development on the possibility of producing a wholesome variable diet, sustainability, and living conditions in cities due to migration need no elaboration.

• Thus, commercialization has made major inroads into independent food production systems both on land and sea (factory ships). This has deprived many small holders, fishermen and their dependents unable to meet their nutritional needs as they have been denied their sole major source of income. As most of them are adults, their only choice now seems to be to become unskilled seasonal laborers and eke out a precarious living. It is difficult to see how this piece of the ‘value chain’ could be of any benefit them in real life.

• At this point, let me give a brief historical sketch of the developments in supplementation sub-system. One it may be envisaged as a two-pronged approach. The first involved the actual supplementation of the ecosystem services either in depleted areas, or that in areas where they were insufficient prior to any previous cultivation. The latter is most likely to be motivated by population pressures. Irrigation undertaken by rulers of ancient Sumeria, Egypt, Incas of Peru, Ceylon are too well known to be described further. Even local communities like those in upper Pan sheer valley and Nooristan in modern Afghanistan have been documented (“A Short Walk in the Hindukush” by Eric Newby in 1956), Irrigation channels have existed in hill farms of the latter province long before its forcible conversion to Islam in 1895

Advances in engineering enabled the development of tools to enhance soil tone by thorough ploughing, damming the streams to form larger and more solid reservoirs and irrigation channels, and planting, weeding, harvesting tools etc., all of which were fully commercialized. Obviously, these innovations are capital-intensive, and as such entail varying numbers of job losses even though they improve the yield and hence food security. However, not much has ever been said about how the now unemployed farm workers may benefit from that increased yield. In real life, what it means is greater food security at the expense of malnutrition for some.

As a result of the diminution in bio-diversity in permanently cultivated areas, loss of soil fertility and increase in plant and animal pests and pathogens resulted. Here, advances in sciences were again used to make chemical fertilizers and biocides to counter these two problems even though their interaction with the environment was ill understood at the time. These now range from critical problems like salination of the soil in huge areas (Aral sea disaster, islands of Indonesian archipelago and the latest candidate for disaster, Maipo valley in Chile), and the permanent loss of amphibians and fish from many European streams exacerbating the increase in insect pests. Commercialisation of these developments not based on a near total lack of relevant knowledge seems to have been motivated by a desire for profit rather than anything else. Long-term health consequences of soil pollution by these two agencies have been fully discussed at the GSOP conference hosted by the FAO earlier this year.

The second prong of supplementation involved breeding animal and plant species with greater yield than parent species, which has been carried out since the ancient times. It should be emphasized here the ‘improved species’ generally give a higher yield, but required greater quantities of fertilizers and biocides to survive. Moreover, their ‘improvement’ usually involved the quantitative and cosmetic aspects rather than a holistic improvement, for they often lack the taste of the original, ability to withstand its natural enemies owing to the limitations in its genome, etc.

Various techniques to alter plant and animal genomes in the laboratory to achieve the same objectives as those above has been introduced and continues, for it is a billion-dollar industry. However, the toxicity of Maize pollen from genetically modified plants to pollinators in the US has been known for some time, a trustworthy goal-directed scientific enquiry into its safety to our environment including man remains to be undertaken.

Another yield improving method is the use of growth accelerators in spite of the warning given by both scientists and environment groups. Once again, this is a billion-dollar industry not to be influenced by scientific facts. However, EU has been working on identifying the agro-chemicals that act as endocrine disrupters

Which indeed is a grave threat to human and animal health.

• Coming down our outline of a food system, we now reach preserving system. Once again, a historical perspective shows us drying, salting, and smoking were common domestic practices long before they were commercialized. Moreover, the Greenlanders have traditionally preserved meat by burrowing it in holes dug in ice. Furthermore, preserving fruits as jams and jellies, pickled vegetables were often done at home. Needless to add cheese, butter and other dairy products were known for a long time before they were industrially produced for sale. Thus, commercialization entered into food preservation by direct and indirect means.

• Our next item on progressive commercialization is the preparation/culinary sub-system. Early records show that while husking the grain remained a domestic chore for a long time, grinding it into flour became subject to a primitive commercialization when the farmers had to get their grain ground at the mill of their land owner. Later on, a professional miller took it over on his own account. In both cases, the customer had to pay in kind, and later on with money. It must be noted that husking grains like rice before cooking is still done at home in some rural areas in Asia and Africa. From this, it was a small step for a trader to purchase grain, husk, and mill and sell it to an end-user ready to be cooked or baked. Later on, this was extended to other food stuffs including meat, poultry, fish, fruits and vegetables that was cleaned and sometimes cut into filets or portions, packed in convenient quantities to be sold. One often encounters this in every affluent and even in not so affluent countries. Effects of this practice on the nutrients, especially when they are frozen as it is frequently done, is not very desirable.

• How the whole preparation system including the culinary system proper has been commercialized needs no elaboration. We do not know with any certainty where cooked food was first made available for sale, but every eating place ranging from the humble street kitchen to most prestigious restaurant represents this practice. Naturally, the degree to which these establishments cater to our balanced nutrition and dietary enjoyment varies immensely.

• Carrying this development beyond reason from a nutritional point of view, the whole preparation system has been industrialized to produce items frozen and sold nearly throughout the world. While some of those carry well-known generic names of dishes like pizza, beef Stroganoff, etc., their relationship to the original is often difficult to recognize. Their actual content and effect on our health has increasingly become a matter for concern.

• These represent a direct commercialization of various sub-systems in a food system. I have purposely omitted to mention two sub-systems until now because they are always used what I would call recursively i.e., repeated used in one form or the other between and within every sub-system. They are the transport and storage systems. Trimmed of their technical gloss, they are respectively concerned with moving something from one place to another, and keeping something with least possible damage for a certain period of time. It needs no explanation to see the generic identity among man carrying his harvest on his back, it sent by rail or a container ship, as well as storing surplus meat in the hollow of tree or in a large refrigerated facility. Even in our grocer’s unloaded items are transported to a store from which they are again taken to the shelves to replenish them as needed.

• Our last but perhaps the most insidious form of commercialization falls into two groups. The first involves purchasing huge quantities of food items, particularly like cereals when they are cheap in order to create an artificial scarcity and wait for a sufficiently long time for the prices to rise. Then the stock is sold for a greater profit, the best known instance of this practice is the “Great Grain Robbery” committed by the former Soviet Union in 1970’ies.

• The second group comes in two flavours. In the first, food or cash crops like coffee to be harvested is bought from poor producers on advance payment of the whole price or a part. Naturally, this is a gamble, but it is undertaken after thorough study of the possible risk of loss. The price paid here is always considerably lower than the market price on harvesting, and the producer hardly ever receives a fair price for his produce, but the seller makes a respectable profit at the expense of the producer and the end-user.

• Another variant of this involves the first buyer of the future crop selling it to a third party for a more moderate but a more certain profit, while the latter awaits a favourable moment to make the final sale of the item. Naturally, this may be continued to a fourth or even a fifth buyer before the item is actually sold. This comes under the impressive name ‘speculation in commodity futures’! Reader may work for himself what effect these activities would have on the affordability of food.

• Now, we come to two other sub-systems that have been glued onto every commercialized, actual sub-systems of a food system. These are the packaging and advertising systems. Sometimes, they operate in tandem as can be easily seen on the labels on packages/boxes of industrial frozen ‘food’. Their eye-catching colouring and audio-visual means of advertising used in combination, has already attracted a considerable demand for such products. The enormous profits made by package ‘designers’ and advertising companies is well-known, and I need not elaborate on the health consequences of consuming such items, and how unfortunate that the end-users pay for eye-candy of advertising and packaging without getting anything of real value in return.

**Conclusion:**

Food systems have been in use since the emergence of man, and its necessary components were already in place during the Stone Age. Its most radical addition came with the invention of agriculture as well as nomadic way of life. This involved using a part of our environment either for cultivation or the sustenance of household animals, and thereby creating an actual food production system. Our growing mental acuities enabled us to invent an early supplementation system in order to counter the depletion of ecosystems services brought about the loss of bio-diversity arising from repeated cultivation of or grazing in the same area.

Next important development was the division of labour and the emergence of barter system, which was then replaced by trade via an intermediary between the producer and the end-user. While scientific advances had some benefit, its adverse effects have received very scant attention indeed. Simultaneous with this, sub-systems of most food systems have been commercialised to varying degrees making understanding what may justifiably constitute a food system difficult. An attempt has been made to achieve that objective, and I hope that the discerning readers would look at it as showing a set of human activities in real world where they perform a definite purpose viz., keep us alive here and now, not in theory.

I would be happy to provide any clarification should it be required, or help in making a graphical presentation of the system outlined here.

With best wishes,

Lal Manavado.