UN Workshop on

Technology and Families

BACKGROUND PAPER

The Technological Revolution – Opportunities and Challenges for Families

Back

Table of Content

The background paper was prepared by a team of consultants. Dr. Mike Cooley prepared Section I, Mr. Marcel Fabri prepared Section II, and Mr. John Balaba prepared Section III.

[Back to top]

Section I: Introduction: Social Change, Technology and Families

Since human beings first fashioned primitive hand tools, technology has continuously transformed the way we life, the nature of our relationships with each other and the manner in which we interact with our environment and nature itself.

As we approach the 21st Century, technology is all pervasive in industrial societies and is increasingly impacting itself upon developing countries. It is said that technology affects us from the cradle to the grave. All embracing though that may sound it is an underestimation of what is happening.

Technology now affects us before we are born and in many cases after we die. How and if we are conceived now frequently depends on technology. Once conceived, the fetus will be monitored and in some cases remedial surgery will be undertaken on the child even before it is born. At the other end of the scale even after death, part of us may exist as transplanted

organs or as frozen sperm and embryos. It is now perfectly possible to produce offspring many years after one's death. In consequence, the notion of what it is to be a mother, a father and "to have a family" is being daily re-defined.

Our ability to predict technological developments and the significance of its various forms is usually deeply flawed and even experts can be amusingly wide of the mark. Thus Charles Duell, commissioner, US Office of Patents declared in 1899: *"Everything that can be invented has been invented"*. Also, Thomas Watson, IBM Chairman assessed in 1943: *"I think there is a world market for maybe five computers"*.

This section will attempt to look at the transformations technology has brought in its wake and identify key features which may help us to set out policy options for further consideration. This section will look at some of the existing and emerging technologies and attempt to identify the way in which they can be creatively applied or modified in such a manner as to be supportive of the family in its many diverse forms throughout the world and in a broader sense be caring of humanity and our delicate eco-system [see Annex].

Technological developments have enabled us to extend our physical muscular power through the use of levers, hand operated lifting equipment to the present day massive earth moving equipment so that we can now, literally, move mountains. Our vision has been extended through the use of telescopes, electron microscopes and now satellites -–our eyes in space. Human calculating abilities have been extended by the use of equipment such as the abacus, Babbage's Difference Engine and now powerful parallel processing computer devices which can carry out calculations in fractions of a second that previously would have taken thousands of years by traditional means if this were possible at all. The scope of travel was extended through the use of rafts, boats, animal power, wheeled transport and in the last hundred years air travel has developed at an astonishing rate and in an earth shrinking manner. There are now those who work in New York for four days a week and spend the weekends with their families in Europe. This new found mobility, even in its less dramatic forms, places great stress on traditional family relationships.

Although human beings created them, these technologies bring in their wake, many problems for society. Witness the congestion and pollution in cities resulting in large part from that giver of mobility the private car and the burgeoning automotive industry. Furthermore, at a more general level many individuals now feel diminished and displaced by the equipment they have created.

Those who introduce technological change and development often describe it as being synonymous with "progress". History shows however that it is not usually so straightforward. As the millenium draws precariously to its close one sees that technology is in fact a double edged affair. It produced on the one hand the beauty of Venice but on the other the hideousness of Chernobyl. It spawned the caring therapy of Rontgen's X-rays but also the awesome destruction of Hiroshima. It resulted in the splendor of the Taj Mahal and the horrors of Bhopal.

A key requirement as we approach the 21st Century is the capacity to identify the positive features of technology and build upon these whilst at the same time recognizing the negative features and eliminating or at least minimizing them.

Viewed historically, technological change has tended to make process (and work in general) capital, energy and chemical intensive rather than labor intensive. We replace

people with machines. This is particularly well illustrated by looking at agriculture.

At earlier historical stages and even today in some parts of the world, agriculture and food production is the primary form of activity and is labor intensive. In the developed countries, food production has been transformed into factory-like work dominated by multinational corporations within the agro business. On the one hand, productivity has been dramatically increased whilst those employed in agriculture have been decimated. There are family owned farms in the UK that only twenty-five years ago employed sixty people and they are now being run with only five people. Rural family units are being fragmented in consequence.

A number of issues arise from this. Environmentalists hold that this has led to a massive destruction of the flora and fauna around us. Furthermore, there is a growing concern about the quality and even the safety of the food produced. BSE, E-Coli, and Salmonella have all recently been an issue in Europe. Rivers are polluted on an unprecedented scale.

In an employment sense, technology destroys jobs as well as creating them. The earlier forms of agricultural work were often harsh, backbreaking and very uncertain e.g. the Irish potato famine of the last century and today the consequences of drought and flooding in many parts of the world. On the other hand, such work in the past supported relatively close knit communities with family units playing a pivotal role in the production of food. Furthermore, cultural activities and religious holidays such as Spring and Harvest Festival were closely associated with the activities of sowing and reaping. Above all, there was a closeness to nature and an understanding of its cycles.

Recent years have seen a dramatic decline in traditional rural employment and a lack of any creative plans for alternative work. In consequence, there has been a hemorrhaging of young people from rural areas into the already overcrowded cities. This has resulted in the breakup of families and the decline of small towns and villages. Indeed an earlier EU report pointed out that unless creative steps were taken, some one hundred thousand small towns and villages would cease to be economically viable by the turn of the Century. This is already becoming an unfortunate reality.

Traditionally, the family unit in its diverse forms worldwide and with its many defects, was nonetheless the backbone of many rural societies. The cohesion, cultural continuity and generational solidarity it engendered is now severely threatened. The impact this is having on regional diversity, local culture and customs and even linguistic diversity is enormous. The impact on families is self evident. It is a worldwide phenomenon and in its diverse forms can be identified on native American reservations in the USA and Canada, in rural Ireland and most EU member states, in China on a massive scale, in large regions of the Indian sub-continent and in vast areas of Africa.

Huge though these problems are, it is already possible to detect, if only in embryo, ways of using technology, new organizational forms and economic policies which will firstly alleviate these problems and then gradually enhance and improve the quality of life of those involved. A few examples are cited below:

In Finland the "Village Action" programme was initiated a few years ago. In conjunction with local communities it uses new technologies and broadcasting to revitalize small villages and communities and this in turn has an enormous impact on families. A series of training broadcasts transmitted by Finnish Radio had two hundred thousand listeners. By

1992, two thousand eight hundred village committees had been formed covering more than two thirds of Finland's villages and initiating projects mainly in the areas of culture, leisure, communication services, housing and economic envelopment. These involved some two thousand five hundred people directly and positively affected the lives of around five hundred thousand people.

The final outcome of Village Action is still not clear. However, experiments of this kind could be monitored and an inventory of positive options worldwide made available to the relevant agencies. Appropriately adapted variations may present interesting possibilities in other parts of the world.

In rural India agricultural land was an integral part of the family and its sustainability. It provided a basis of identity, a source of family cohesion and sustainable transmission from one generation to another. It was also a context for both the acquisition and transmission of social, cultural and technical skills.

Agricultural technology is now rapidly changing this situation from a means of sustaining the family to one of competitive agricultural industry within a market economy. These changes now require creative responses. The dissemination of basic information about simple low energy means of food production and its distribution could contribute significantly. Food processing could open up new markets and would be more profitable than the sale of the basic produce. Non agricultural forms of rural employment could also be facilitated using new technologies.

New small rural industries could be founded and the skills to develop and run these could be supported by forms of distance learning in conjunction with learning and earning projects. Information of this kind and also details of new forms of banking developed by women's groups in rural areas, could be made available through two-way Village Information Centers. Furthermore, communication technologies could be used to set up new distribution systems where producers could communicate more directly with end users.

It is important to realize that the cultural, economic and even political impact of technology may be quite unforeseen. Throughout most of human history, performing arts were "live". That is to say the artist, (actor, singer or dancer) was in the same place and at the same time as the audience. A further limitation was the distance of the artist from the audience in order to ensure the largest audience but still allowing them to see and hear the whole performance. Quite elaborate technological solutions existed at that time – e.g. witness the astonishing acoustics of the Greek amphitheaters.

An apparently disconnected technology was to change all of that i.e. the ability to transmit and receive a signal over considerable distances a la Marconi. With the ability to make recordings, time as well as distance was separated from performance. If you had a radio, you could hear Caruso without attending an opera house and if you had a gramophone and a record to play on it you could hear him at whatever time of the day or night you wished – even after his death. Add to that films and then Hollywood and you could experience the dimension of grand vision as well.

An explosion of inventions ensued, leading to our present day multi-media cultural industries. Literally millions worldwide could witness the World Cup or a concert by the three tenors in real time. We can record the performances and relish the highlights over and

over again in replays. The phenomenon of the Beatles and the huge commercial activities which surrounded them would not have been possible without exposure on the emerging media.

Positively used, there are clearly many advantages to all of this but there is also a downside. We are transformed in increasing numbers from **participants** into **viewers**. However, there is part of our culture and humanity which wishes (needs?) to actively participate and if we can't actually do that, then we can at least be present. So we still talk of the thrill of live theatre or music and of the atmosphere when in the stadium at a major sporting event.

There are many subtle issues here for consideration by policy makers. For example, in the field of education, multi-media systems allow children to view flora and fauna in remote parts of the world. This is second order reality. It may supplement experience but is no substitute for the smell of the hay, the wriggle of worm caught in the child's hand, or for having plants and wildlife explained in the context of the family, community or school. The old Chinese saying correctly reminds us:

"I hear and I forget;

I see and I remember;

I do and I understand."

We should not underestimate the contribution families can make to these educational forms. Furthermore, in many family businesses children learned to succeed their parents or even transcend them. Versace learned dressmaking and clothes design in large part from his mother who was a seamstress.

In several EU member states there is a concern about the decline of family businesses and the need to provide new forms of development and employment. Institutes and programmes are being set up which have facilities for using new technologies to serve outreach activities in small towns and villages. There are also facilities for distance working as well as learning and it is hoped that this will contribute to producing interesting sustainable jobs for families in rural areas.

In the case cited above, when the artist's performance is separate from the audience, the artist is working in one place for the audience (the clients) who may be thousands of miles away. This and related technologies opens up the possibility and the actuality of extensive distance working. As examples of this distance working, companies in the USA get insurance claim forms processed overnight in Ireland; reservations for aircraft operating out of London Heathrow are data processed overnight in India and medical specialists in London carry out remote diagnoses of patients on the Isle of Wight.

The potential of such technologies to support family health programmes, job creation schemes and education could be significant, including for disadvantaged groups and those in more remote areas. In this context, the NET is seen by some as sort of technological panacea. However, as pointed out earlier, this technology like all technologies is double edged. Potentially, it holds out the promise of accessing the world's cultural and educational treasures. On the other hand, there is material on the Internet which is deeply offensive, sacrilegious and downright obscene in many cultures. These concerns can

however be addressed by having a local NET Node Point and a Local Area Network based on the local languages and reflecting indigenous cultural and other values.

Another concern, already highlighted in America and Europe, is known as Internet Addiction. Manifestations include young people being reluctant to join family events; spending more and more time "connected"; becoming isolated; increasingly irritable and preferring "electronic relationships" to relationships with families and friends. Ironically, one of the counseling services for the addiction is available on the NET itself costing thirty dollars for a session with an addiction therapist.

Against this must be set the obvious positive developments which are already being facilitated by the internet technology. Tele-pathology is a case in point Already a breast cancer specialist in London has diagnosed a patient in Edinburgh on the internet screen. Specialists would like to see five times as many breast cancer cases referred for a second expert opinion and tele-pathology will make this possible.

These two polarized examples have been cited so that it will be clear that in any given technology there are a number of different application options and that the technology should not be accepted at its face value.

It is frequently suggested that the only way in which underdeveloped regions or countries can develop their economies and the wellbeing of their people is to "catch up" with the technologically advanced nations. This can be a long and painful process and can leave countries in a position of continuously attempting to catch up with what is essentially a moving target. One way of partly overcoming this problem is by planning to "leapfrog" in particular areas. The sheer rate of technological change can actually facilitate this.

Viewed historically, the rate of technological change is increasing exponentially. Primitive wheeled transport existed in that form for hundreds of years. Steam engines of the Watt type were in use for ninety years or more. In the thirties, equipment was written off in some thirty years; in the seventies and eighties it might be around five years. Today, equipment, in particular software, is being introduced which will be superceded and rendered obsolete and obsolescent in as little as six months. In certain carefully selected cases it is possible to leapfrog into present tense technologies. This is an option well worth considering in the context of technologies to support the family.

One obvious example is in the field of communication technologies. There is no reason why remote and disadvantaged regions or even marginalized groups should not conceptualize themselves as "Low Tech Areas with High Tech Communications". As suggested elsewhere, these high tech communications make possible-remote diagnosis, distance learning, distance working and the creation of virtual multinational family businesses.

In the case of this latter, one could envisage young people who have left their families and regions and re-located elsewhere, being in a position to ‘distance work’ with and support the families and communities they have left behind and of viewing this as being to their mutual advantage. A practical example would be in the field of medicine where alternative treatments based on local plants and herbs or perhaps acupuncture techniques, could be linked in with Western type technology to create virtual organizations capable of offering alternative treatment options to both groups and in the process, creating cross generational interaction and solidarity.

Many technologists pursue the introduction of technology with a sort of missionary zeal. Some do it because it is profitable for them or their employers. For others, it is a deep conviction that it constitutes progress and it is their 'raison d'etre'.

In some cases, it actually seems to be a matter of having a solution and looking for a problem. More sensitive design methodologists often point out that the correct definition of a problem will constitute as much as 75% of its solution. We would be well advised to re-examine how we define family problems and how we identify the origins of those problems and the most elegant and humane way of solving them.

In many parts of the world, technology, in addition to bringing benefits, is also creating huge problems. Invariably, we are invited to believe that the way to solve these problems is to have yet more technology. In some cases, technology may be part of the problem rather than the solution.

[Back to top]

Section II - Impact of the Technological Revolution on the Family: Opportunities and Challenges in Developed Countries

I. Background

Family, perceived as a major institution, has remained a central issue in the recent evolution of Western society. In the overall transformation that has affected the way of life of millions of people, as well as their perceptions of social values, technology is deemed to have been a prime causal factor.

Technology, essentially is a main characteristic of contemporary civilization, pervading the entire society, for better or for worse. This is not, however, a revelation. The story, has been told repeatedly for almost two centuries, since the Industrial Revolution erupted in England and expanded to the rest of the Western World.

The past industrial revolution and the new technological revolution are, however, not comparable. Although both were borne of technical progress , they are distinct systems, one industrial, the other technological. They are different and to some extent antagonistic, bringing forth different outputs. During the past two centuries, the progressive development of capitalism has relied heavily on workers, transforming peasants into producers of manufactured goods. The recent technological advances in the industrial countries have made people practically non-essential, except as consumers. Also, the capitalist system has become global, an international division of labor has taken care of production.

Prior to the advent of both the French Revolution and the Industrial Revolution, which brought about transformations in every sphere of European life, the family had been a

model of stability. Because of high mortality, affecting all age groups, generations used to succeed one another. There was practically no overlapping of generations. Fertility was governed by local habits and moral values, marriages responded to sets of social rules strictly meant to ensure reproduction. Within this context, the family model relied mostly on factors intended to achieve the survival of the group: residence, genealogy, succession and inheritance. The raison d'etre was to sustain a balance between two frameworks : the physical environment, and the social organization. Family was the smallest component of the social structure and the guarantee of its coherence and stability. This system tended to embody most of the consanguine relatives under a single roof and was indicative of a perennial way of life.

This pattern was changed by the coupling of the economic revolution in England with the ideological revolution in France. The former deeply altered the condition of life, and economic undertakings turned into autonomous activities, distinct from the prevailing cultural system that, at a later stage, they would transform. The latter, by way of rationalization and reforms, favored the notion of contract between two persons, made free and equal by law. Therefore, instead of the institution of marriage the dissolution of the family by divorce became conceivable.

During the past two centuries, the traditional model of the family strove hard to survive. However, new conditions set by the environment and accelerated by technology, promoted a nuclear family. At face value, this was envisaged as a reduced version of the traditional pattern of families, with a particular focus on direct lineage: father, mother and children of rearing age. New features, however, appeared and became instrumental in shaping a distinctly new model of the family. The new features which contributed to a new family type were the technological advances in health care and hygiene, the spread of urbanization, the necessary reduction of family size, and marked reliance on the State to compensate for the loss of solidarity previously granted by the community.

The XIXth century represents a period of transition to this new model of the family, which developed right after World War I. By and large, during the process of industrialization, rural to urban migration led to insecure settlements, poverty and family instability. A major consequence for the evolution of the family was that families sought survival thorough protective self-reliance, including procreating numerous children, regardless of detrimental economic and social conditions, an adverse environment and the waning of community life.

This situation, albeit real and terrifying in most instances, resulted chiefly from external factors that were due to improve with the advance of the century, particularly as material progress proved sustainable. Improved material conditions, the expansion of educational opportunities, the decline of infant mortality and a more effective medical care resulted in a smaller sized family. Moreover, many more people born in this century could hope to live long enough to know their grand-children and live a married life of 35 to 40 years. In addition, the early development of commerce and industry induced a sense of familial ownership, where two generations could own a family firm. What was not anticipated was how a longer life expectancy would later lessen familial bonds of such enterprises in favor of production-oriented public organizations. Within the family, there still prevailed the authority of the father, due to the security brought about by assertive labor movements in Europe as well as the rapid gains in productivity within the United States.

The situation, however, did not remain static. Indeed, with the advent of the technological

revolution, the family, as a social institution, seemed to disintegrate and to become one of the weakest components of the social organization. Technology related changes brought forth new patterns of power relations within the family, i.e. women emancipation. This newly gained independence, and its ensuing empowerment, have encouraged new changes in family structures, roles and functions. Furthermore, technology, by and large, has been fundamentally involved in the realm of life and death, e.i.: two major aspects of demography: (advances in contraceptive methods and the decrease in infant mortality), enhancing and augmenting food security, hygiene and health care. Moreover, the dramatic reduction of fertility in the industrial countries and the alarming rapid population growth in developing countries, both contrasting aspects of technical exertion, have modified in-depth the age structure of the populations. This has had noticeable consequences on the evolution of the concept of the family, bringing forth unprecedented problems. Last, but not least, the impact of technology on the social environment induced different perceptions of time and power, which altered the nuclear model of the family.

Nowadays, if the traditional family in developed countries appears only as a remembrance of the past, it cannot be claimed that the concern about family has faded away. By losing its character of institution, the old model gave way to new forms that interacted with society to make it more permissive. The concept of family today does not refer to a specific model nor is it characterized by the disappearance of the nuclear type. The concept of Family is characterized by the coexistence of various forms. Most of these forms are not legitimated by marriage; however, all are acknowledged as either a private contract between two persons, whether implicit or not, or by one parent's decision to rear alone the offspring of a casual relationship. One may wonder what would be the best formula, depending on the goal pursuable. The question about the uncertainty of family involves, actually, the future of society and what is meant by well being. In summary, it seems that, the liberalism usually limited to the global economy, has pervaded as well the social structures, leaving the "natural order" to take care of their future.

[Back to top]

I. Education, Communication, Information Technology and Families

a. *Introduction*

The most spectacular evidence of today's technology is better displayed in the fields of communication and information. Practically everybody has been given speedy and universal access to telephones and media, to computers and internet networks. Within the current economic system, mass production of information and communication devices have created a vast new market for a huge variety of applications. Notable, for example, are the computerized banking systems which resulted in saving considerable time and energy. Credit cards, cash machine, smart cards, online banking, are all new features tending to centralize personal banking operations at home.

Communication as an instantaneous mode of interaction enables one to find the individual in any location or hideaway. This is viewed either as an advantage or a loss of privacy. Abundant information, rapidly disseminated everywhere, is shaping a new society and a new economy. The State is heavily dependent on computers and

communications, while the decision of defining technology is being taken by private corporations that own the systems. Power is in a process of being transferred from the State, the representative of the nation, to an oligarchy of private interests.

It is often said that "information" is power. One may wonder, however, about such an abundance so widely released, which is likely to confuse or to reach a zero sum equation. Also, as information tends to become more perishable a material, "Power" should be deemed to rest with the proper or tailored information. Discrimination becomes, therefore, a key factor in the efficiency of information.

[Back to top]

b. ***Impact on the Family***

Traditional and new family models are both reflected in the media and the advertisement. This in fact has mirrored the instability of contemporary society as well as the conflict among transitional values. Western commercials, for instance, generally address the ideal nuclear family, that remains the model alongside the preserved values. At the same time, the news media, the movies and some T.V. industry portray the emergence of manifold families, e.g. cohabitation, deliberate single parent or same gender unit, acknowledged in a few European countries, [Sweden and in France for instance], as a binding contract between two consenting adults, mostly for property devolution. Thus, such a society has perpetuate the model wherein a majority of people still want to believe in the nuclear "Family", while ratifying changes it underwent that reject concomitant values. This state of affairs is further exacerbated by the abundance of information and its broad dispersion by the mass media.

Computer technology is adding a dimension to the life of individuals. This is happening, however, at a time when more and more people are looking back to a sustainable pattern of the family, and trying to revive it as a result of the experiments of the 1970's which engendered other substitutes for the nuclear family. A powerful catalyst, such as information-communication technology can contribute to eliminating an important function of the family: its memory retention.

The abundance of information, becoming ever more ubiquitous actually threatens individual privacy. Within the family, this output of technology impacts negatively on domestic relations between family members. Internet and e-mail, as personal extensions of the individual, are highly demanding and time consuming. They serve as a factor that can mitigate family cohesion. This fact attests to the wide range of specific interests members of the family can develop with many other individuals outside of the family environment and who seem to exist only on the screen but are nevertheless influential. This raises the question of the useful expansion of inter-communications, or the intrusion of dissenting opinions, or beliefs. Efficiency of information is also another issue, particularly how it specifically permits sound decision making within the family.

Concomitantly, individual rhythms and distinct perceptions of time pervade family life, since each member is affected by a differential acceleration of time that leads to a de-synchronization of the family. This uneasiness results apparently from the distinct paces involved by family members in absorbing the rapid technological changes. In

addition, as individuals most of them gain diverging views and interests in light of their own distinct channels of information and communication, which tend to prevail over intra-family values. As a result, each member is inclined to have his or her own agenda, to the extent of detachment from the community. To characterize family, the only valid criterion would then be "common residence", though this is not evident.

Because of increasing facilities in communication, individual mobility has definitely been encouraged. Travels, whether personal or professional, have become part of contemporary family life. Home and work place do not have to rely anymore on proximity. Family members can be located, hundred of miles apart due to the necessity of the work place, but always, in instant communication with each other. As a result, the notion of residence, once a major characteristic in defining a family, is waning.

[Back to top]

c. *Education*

Technology, which engenders the possibility of accumulated knowledge, seems to compete with formal education. For some time now, courses in mathematics or related disciplines have been programmed on television. Schools, however, benefiting from the personal computer, resort increasingly to the same sources of versatile "canned knowledge". Lack of systematization in the transmission of knowledge expose the younger generations to a risk of hiatus in their education. "Easy come, easy go" information compete with formal teaching, which itself is becoming a tributary of the new media, relying more on ephemera than on an organized body of erudition. The new generation is desirous for quick answers and electronic technology tends to eliminate the need for books and a lasting systemic view of a subject. The dictionary type of learning tends to supplant the encyclopedic approach. Self teaching through computer courses has advantages. Nevertheless, the drawback is that the student, being alone, must be motivated at all phases absent the guidance and authority of the teacher. Passivity and inconsistency, as hindrances, are the outcome.

For years, educational systems in developed countries have been urged to relate to the requirements of the industry at large in the teaching of skills, but to no avail. Now, with the ever present changing socio-economic conditions, the immediate problem is how to prepare people who are likely to adapt their specialization to the changes in current knowledge and applications. The ability to adapt supplants specialization, as education becomes a continuous process of reconversion and readjustments.

Education at large is no more the password to employment and higher salary, as downsizing, would suggest , which has more often affected the college-graduate than the blue-collar worker in the United States. Only isolated ethnic groups continue to look at education as a way of social integration. Moreover, in Europe, education is no more a safeguard against unemployment.

In the field of formal education, the democratization of education alters the original mission and purpose of the university which is to shape the mentality and sharpen the tools of analysis and discernment. This is seen in the introduction of new standards into the academic institutions (i.e. shared authority between students and educators and wider access to education). It is also seen in the introduction of new requirements

to match the demand of business with highly qualified technicians, (teaching focused more on practice than on theory). These have contributed to widening the gap between generations and have somewhat devalued higher education, perceived as specialized professional training and a passkey to employment. In the short run, by and large, companies in developed countries prefer specialized training, [knowing otherwise that this will soon become obsolete in the fast changing environment of technology]. In addition, since they favor low wages, a high turn over of employees may suit them. In the past, accumulation of experience was a meaningful asset. Albeit still systematically required for professional recruitment, experience is currently at risk of being considered as an accumulation of bad habits and a liability. Adaptability to new emerging techniques, although appreciated, is subject to a cost/benefit evaluation in contrasting short term and long term perspectives

Along with the technological development, changes in formal education, such as a reduced role of memory, has become a problem issue. Mostly in elementary schools, teaching has become more image-based relying on graphic experience. For centuries, the dissemination of knowledge was based on focused transmission through language and texts. The new technologies introduced a media whose impersonal support is more auditory and visual, even tactile, since the fingers directly release the information and sequences of action. Likewise, recording the sounds and their signifying messages through the dissemination of frozen speech or discussion, without having witnessed the actual event is an opportunity that children are taking advantage of with motivation, the child can learn by himself or herself through inter-communication devices.

Further changes have hampered the educational role of parents. Not very long ago, the parents had already relinquished to the school part of their responsibilities as educators of their children. This was consistent with the long process of delegating family rights, when communities over time yielded the solidarity, due to the rise of the central authority of the State. Thus, parental authority over organized knowledge was challenged by an external and somewhat uniform educational system. Presently, even the school system has a new and powerful competitor. First, in the form of television, then increasingly in the form of personal computers. Both are easily accessible to the children at home, while their parents attend to their own preoccupations and interest. Interactive video games allow children to enter the virtual world where, among others, violence entails no risk and everything becomes accessible. Information and communication technologies foster among children their own perception of time as distinct from their parents, and sometimes from each of their parents. One result is that the prestige and authority of the parents have diminished.

As flows of disparate information invades every home and reaches every age, the problem is no more one of quantity, but instead of selectivity. The media contribute widely to this permanent dissemination of happenings. The way they proceed, in the United States, may serve as a lesson for dealing both with the waste of information and its confusing impact. The moral code of the media prescribes that news must be objective, being delivered as a raw material, with as little comment as possible. The press is free of censorship. News to be released must, however, be selected and efficiently done according to some criteria. One criteria is to meet the expected interest of the audience, because the information, being collected for commercial purpose must match the demand of the public.

The consumer of information actually has to proceed the same way and make his own selection, if he wants to avoid being drowned. What is therefore, important is his or her capacity of discernment, because personal interest cannot be the only guide. Organized knowledge and its understanding, allied with the development of a critical mind, are the ingredients of discrimination. No doubt these requirements are those which are expected from an educational system. It appears then that a proper educational system, one that refrains from competing with the realm of information by stuffing its students with perishable trivia, is the answer to the efficient management of what is eventually the best output of technology. Education appears to be the real challenge.

[Back to top]

II. Employment, Technology and Families

The Structure of big business has rapidly changed, impacting on small companies and on consumption as well. Economic structures adjusted accordingly, both in the fields of finance and production, involving geographical and administrative decentralization and altering the type of work, with a direct impact on the manpower characteristics. In the USA, white-collar workers outnumber blue-collar workers.

Women play at present an important role in the labor force market in the USA and in many European countries. For a long time, they used to be only part of the production, but since 1965, as a pivotal year, they have become rapidly involved in executive positions of corporations. Seven years later, however, this proportion fell to 50%. With increasing empowerment, women could envision careers and financial independence. Currently, more than two-third of the married women in the USA are participating in the labor force, most of them actually in need of a second salary in the household. For the developed countries, the participation of women in the labor force represented 43% of the total, in 1995.

Traditional social structure, in particular the concept of social class, is being altered with the emergence of new workers, entrusted with wider responsibilities and denoting a more technical background, who feel that they are not blue-collars anymore. Mobility and readiness to change jobs and/or locations has become an important aspect of the employment market, since interchangeability of activities is increasingly difficult. This was further facilitated by the development of communications, whether faster transportation systems or instantaneous ways of inter-connecting persons (phone, fax, internet...). Interestingly, a side effect of technology is the preference given to the recruitment of temporary specialized consultants over permanent staff assigned to one location. This obviously has increased both the short-term professional mobility and a feeling of insecurity. This has destabilized families as the rising number of divorces has shown. Technology, actually, replaces the job and not the worker. For the worker, however, the result is about the same: he is no more qualified for the job and becomes expendable, as exemplified by the quasi disappearance of couriers, that the extended use of the fax made useless.

With wide spread automation, and the development of an entertainment industry, there is one more opportunity to enjoy more leisure time. This appears to be the case in Europe.

However, it has not been the case in the United States, where working hours have been steadily rising since the 1940's. In France for example, due to pressure of rising unemployment, the government passed a law steadily extending to all enterprises limiting the work schedule to 35 hours per week, without loss in salary.

Different rhythms in the evolution of structures: there is a need for social adjustment. Institutions made to last, are slow in adapting; workers tend to rely on their past experience, while they progressively lose their qualification, as the structural environment changes rapidly. Many businessmen are reluctant to change their routine, watching the decline of their firm, for lack of sufficient capital, become too expensive. If unemployment is mostly an output of liberalism, as inducted in the regulated global markets of finance, that does not fit its implicit hypothesis of full employment resulting from the competitive equilibrium.

While corporations entered the global financial game of short term loans that provided for a self-reliance with respect to their capital increase, companies all over the Western World (partly as an attempt to reduce production costs, while facing higher risks and huge expenses in the electronic modernization of equipment) have laid off personnel by the thousands. Efficiency has become essential, but while the growing demand has been satisfied by productivity growth, jobs have been lost. When, for instance, in a period of economic prosperity, 10% of the Americans, mostly highly paid white collars and chief executive officers are sacked, this becomes what appears to be a problem of differential or qualitative unemployment. Actually, this tends to become a current practice all over the developed countries, where the industrial sector shrinks under the surge of new automation requiring far less manpower, while service industry swarms with new recruitment. The process, therefore, seems to imply a promise for more job creations. This may prove to be true. But this overlooks the considerable delays of adjustment between job elimination and creation of new jobs, as exemplified by what is happening in France where unemployment has soared to 13%, only begins to slowly recess, after years of climbing up rates. In the same process, rather than recruiting new technicians involving extra benefits, many firms hire not only short-term consultants, but favor part-time jobs, leaving many workers underemployed as well as underpaid. Families are in disarray.

With unemployment came new jobs paying less and a general downsizing in the United States; where, contrary to Europe, trade unions are weak and scattered. However, despite their past strength, unions in Western Europe, have not been able to prevent unemployment. Their action actually contributed to unemployment, since they prevented their members to accept a downsizing, in order to maintain both their social security levels and their rates of salary. With the technological revolution, strikes have lost their major impact, since production relies increasingly on automation. It is only to the extent that the strike reduces the purchasing power of the wage earner-consumer, that it implies higher costs for the firm.

While creating a general sense of insecurity among workers in all industrial countries, these lay offs have resulted in a major crisis in family lives, which mirror the situation fomented in the global economy.

Family income and spending : The globalization of the economy and the phenomenon of mass production, resulting from high productivity, have deeply altered the structure of family consumption. As a result, prices of most goods, in particular for electric

appliances and electronics, have fallen, creating a new and compelling market. Accordingly, quality of life has dramatically improved.

In the wake of its upsurge during the fifties, productivity has been steadily increasing. Its fruits and benefits, however, have not been shared in terms of leisure time nor in terms of individual wage increases for the workers. On the contrary, to compensate for the time lost due to layoffs, work overtime and the loss of salary, consumption has been the major share of household incomes. The extension of credit is another incentive even though high interest rates have put family budgets in jeopardy among low-wage earners.

It is obvious that, although technological advance in work-saving automation has been instrumental in de-stabilizing the employment market, the income distribution and the economics of the family, as well as its social meaning, it had no direct impact on the employment, other than canceling work posts for a reason. Most of the time the avowed reason would be to increase the productivity or just to shrink a personnel made excessive by the modernization. Purposes that are being pursued nowadays are not primarily to save on manpower nor even to achieve a production whose low cost would generate higher profits. New purposes seem to have been set to corporations which are now reducing the objective of production in order to increase their capital. Only a few years ago, capital was aimed at maximizing production. By the transfer of its image on the stock exchange, the enterprise has become a virtual object of which the value has kept few links with reality, other than that capital is the power indicator of the firm on financial markets.

Technological dynamism was already active during the two decades embracing the fifties and the sixties in the United States, during what has been called the "Golden Age" of developed capitalism. While the American economy was only pursuing its rise, the other developed countries were catching up rapidly. What is, however, widely overlooked is that the post-war prosperity would have been impossible without the management of the State, which has since lost its capacity to intervene, not even to protect social achievements. This means that in this new economic order, the family becomes basically an association of individual consumers. At its extreme, the future appears to bear the seeds of anarchic society where family could be destituted of all its functions, except maybe reproduction. Phasing out its survival or its revival begins with reestablishing the State authority to plan and manage economic modernization, together with its commitment to welfare and social security. In order to survive, the economy of free enterprise needs to be saved from itself.

[Back to top]

III. Health, Basic Social Services, Technology and Families

Background

Since the end of World War I, there has been a constant and dramatic improvement in the health of populations in the developed countries. An individual born in 1900 in the USA could only expect to live 47.3 years on average. Since then, the overall life expectancy has increased to 76.3 in the United States and even around 78 in a few European countries. These results, which account for a steep decline in infant mortality,

can be broadly imputed to an improved material standard of living of the ordinary people and are highly correlated with the quality of health care in our societies. People, once helpless against hunger, cold and disease have seen spectacular achievements in their general health conditions. This is mostly due to an improved nutritional balance, in relation with a widespread availability of food in abundance and variety, to a better social equipment supplying a safer environment (general sewerage networks, systematic garbage collection, safe drinking water) and personal habits of hygiene resulting from a broader access to education and to material comfort. The eradication of epidemics contributed also to the rise of life expectancy (i.e. drainage of the Pontan marshes).

In the field of health, many diseases are no longer beyond treatment and are now technically cured and prevented. As a consequence, the labor force has become more productive and physically more reliable, while, by mastering more efficiently the health reproduction, families have been able to control their size.

[Back to top]

Woman's role in family change

Everybody is aware that family can nowadays assume a great diversity of forms and that practically all of these, in various proportions, are co-existing in the developed societies. In order to constitute and sustain a family, a few steps are necessary : encountering the "right" partner, marrying, having children, rearing them, establishing a family life, sustaining a family style, and surviving.

In previous times, people lived in a closed world with restricted possibilities of meeting a wedding partner. This meeting space has now expanded beyond expectations. First, technological facilities on the ground and in the air have allowed people hundred miles apart away to encounter each other; growing flows of internal and international migration have brought together people who previously had practically no chance to be connected. The wide extension of employment to women multiplied the probability of exposing male workers to a gender mixed environment. Telephone communications eased contacts. Even matrimonial agencies are now able to devise individual profiles of their clients and to match them with the hope of harmonizing their union. One could expect that given the convergence of all these factors, the number of marriages would soar. This is not the case. On the contrary, the number of marriages have plummeted in developed countries. It seems that a few elements took their part in this slow down of modern family constitution. One of these is the continuous increase in life expectancy. Young people are confronted with a longer probability of life than were previous generations, while facing an ever changing society. Young people seem unable to anticipate their future. Since they have more choices, it becomes more difficult to select a mate. Cohabitation has increased dramatically in many developed countries, as their societies have become more permissive.

The woman's image is rapidly. It becomes normal for women to envisage an economic occupation that will bring them material independence. The commercialization of the pill has provided many women with an effective way of mastering their fertility.

Women have seen in new contraceptive devices ways of ascertaining their haphazard condition and to ascertain their emancipation in the society. This has greatly changed the pattern of gender relations. Emancipation, equality with man, and empowerment

contributed to the apparent disintegration of the classic family model. When they occurred, marriages were contracted at a later age and children born out of wedlock were eventually, but not necessarily, recognized. What prevailed was a strengthened sense of individuality benefiting as well the child, recognized as a person, though from now on a lonely one.

[Back to top]

Food Production

Food production in the Western world has improved beyond all hopes and has become available from any part of the world, escaping the constraint of seasons. Even small budgets can afford a wide diversity of food. Health, therefore, has considerably improved and life expectation at birth, through safe child delivery, has notably increased. This has given a wider perspective of activities through life. Notwithstanding this, due to a growing sense of insecurity, the future appears to many people, more far reaching than ever leading to an upsurge of personality crises that affects directly the stability of the family.

[Back to top]

Impelling current diseases

While spectacular breakthroughs of medical science succeeded in curing illnesses that had plagued humanity for centuries, new diseases were surging, which mobilized and baffled research for their ever changing immunity to therapy. AIDS has been the most spectacular among epidemics. A few infectious diseases, deemed to have been eradicated, such as tuberculosis, syphilis and to some extent pneumonia have become immune to new treatments and are still plaguing whole regions. But among previously known non contagious diseases, a few have also gained strength to become the main cause of death in developed countries : heart ailments and cancer. These have been the focus of continuous research [through technological advance] that can claim some positive results. Prevention, however, has not shown such dramatic achievements.

Stress-related diseases have impelled and dramatically augmented during the last two decades, in correlation with the rise of insecurity in salaried positions and the growing instability of the family. Women seem to be especially affected by the changing pace of life, the recrudescence of work and home overwork, -despite all the small electrical appliances meant to save time and energy in domestic tasks-, and a sense of failure in managing the household. Such high stress has translated in heart ailments, chronic high blood pressure, gastric ulcers, depression and possibly in an increase of cancer cases, challenging the progress reached by medical technology.

[Back to top]

Inter-generational problems

While the population of the world, under the various impacts of technology, has more than tripled during this century, fertility levels in Western countries have declined under the level necessary for long-term population replacement. This resulted broadly in smaller size families, with one or two children, partly as a consequence of becoming able to plan his or her descent, of acknowledging the individuality of each child and of an

economic choice .

More people are living longer. Family size is shrinking, individual family members have become more independent. Even the most traditional family has undergone much transformation. Increasing longevity requires that a balanced existence take place within the family between the older generations and the children. The number of single parents has increased and that many grand-parents have succeeded in keeping up with their independent existence. But in most cases, solutions have been found outside of the family. On the one hand, the convenient grand-mother, who was baby sitting for the working mother, has now found activities which conflict with the home work. On the other hand, children are less ready to take responsibility for the elderly, even just for company. Their own solicitations are too numerous and diverse.

Commodity market becomes more age-specific, stressing the generation gap. Adolescents are consumption oriented. Commodities are now targeted to their age group. They, therefore, engage in part-time jobs and, between schooling and paid work, they are involved in the general increase of work hours. In many instances, they have to take a job and loans , in order to pay their schooling fee that has considerably climbed up in the United States . While in Europe education, which was mostly under state control and free, tends to increase its private sector, as in England. This adversely affects family income. The choice of a professional career becomes less traditional or guided by personal propensity, but more oriented by wage expectation and, thus leading to possible options, which contributes to the rise of instability.

The elderly, either by consuming more over the counter pain killers consumption, or travels and cruises specially designed for senior citizens, ascertain their position on the commodity market. Moreover, the extension of a health service market allows more older people to be placed in improved nursing homes, reducing the family at face value to its nuclear pattern. With medical care and technical devices, the elderly have been able to lead a separate life from their married children and so remain independent for a longer period.

In the European countries where medical insurance is part of a social security system, the many advances in pharmaceutical industry, highly advertized have increased the public belief in their efficacy. Demand for specific new products has risen accordingly and has put the whole system of social security in jeopardy, because of waste and excess of consumption. With medical insurance being at risk of collapsing the family unit becomes more vulnerable, since each of its members might be left, like in the United States to pursue contacts with private insurance companies.

[Back to top]

Medical improvement and self-care

Meanwhile, however, medical expenses have grown, partly due to wastage and to more sophisticated modes of treatment, either through technical devices or medications. For example, a single blood analysis releases a series of unnecessary results, all singled and all charged. As a result, insurance companies have become overcautious, denying, for instance, to people suffering from chronic backache, the right to a medical insurance. Once probability based, these organizations for profit have now narrowed the risk to zero.

A wider dissemination of information has permitted self-care to expand. People self-reliance in the field of health succeeded in creating a market for non expensive and relatively save kits, which avoids resorting to the doctor for minor health troubles or help people to get more physical independence, especially aged persons. For example, Close Capture TV allows aged and handicapped people to regain some vision. This devise helps strengthening independence for many who are sight impaired, providing them with entertainment and information. Moreover, research in the medical field has become very sophisticated. Its cost has also escalated. Meanwhile, most of the effort is directed to finding a cure to cancer and heart ailments, as the main causes of premature death in Western countries.

What is chiefly needed, is an educated public. It is not the abundance of information that gives real access to health care and hygiene, but a well organized selection of it. This is why advice by competent social workers or technicians are still the most important and most needed to help people facing contradictory announcements, reports or literature.

[Back to top]

Summary

The purpose of this section has been to emphasize the impact of technology on the family, and yet, none of these two concepts has been defined. We are aware that given our restrained intention, conclusions are also likely to be elliptic.

Throughout our broad review, technology stood as a remarkable tool of human power over the natural and social environment. More than anything else, it has proved to be a time saver, that creates a new reality which becomes more true as most people have adhered to it. Deeply impregnated by technology, the society displayed a fictitious world, the same way the econometric model overcomes the reality to become more real, by erasing the imperfections of the contemporary economic life. Society, however, is not a blueprint. It is the real system that technology, being also an ever-changing system, has the power to modify with a pervasive dynamism that reaches every aspect of human life. We may have seen it, throughout, as an instrument to extend human capacity as a catalyst to change people's daily life. Since an instrument is used to transform the object to which it applies, it must respond to some functionality with respect to a system. It is not actually in accordance with the society that technology is functional. In fact, it is autonomous and conforms, at its own pace, to its generative system, its objective being to translate in a continuous process science into applications. It becomes inescapable, having developed its own language and structures, as evidenced by the computer which is a non-dialectal devise, following a binary system of "yes" and "no" that excludes contradiction. Being built on different principles, it does not reproduce nature nor man. Yet, it influences human choices at the root.

Likewise, society as a system is structured, with the family supposed to be its stronger component. What has become of its autonomy and protection in the perspective of technological advance? First, in developed countries or regions that are governed by a liberal economy, ironically, the State has never had at its command such an array of technical power to enforce its administration than at the time it is being deliberately weakened. It governs the individuals, barely the groups; its legislative decisions address the management and control of its citizens, not the plans for their future. It seems to have lost its power to change.

Meanwhile, technology has been instrumental in the dissociation of the family, which has undergone rapid changes and gave way to an heterogeneity of loose structures. It is not so much, however, the pace of the changes that is important than emerging structures and their new functions within society.

That the family, whatever its forms, is necessary for the survival of society, hardly needs proof. Few organizations can claim as many functions, let alone its reproduction function. This situation raises a major preoccupation since the family is to be considered as the backbone of society. Family changes affect the whole of society and reciprocally. Since the process, left to its own, only accentuates the dissolution of the family and the multiplication of occasional and transitory models, and since the only guarantee of the family remains with the existence of a contract, whether on short term duration or made easily breakable, some authority is called for legitimating unions, according at least to the values of the moment.

Tackling the social system, bearing in mind measures of indirect policy meant to strengthen the family unit, seems to be the solution, however uncertain this is, given the declining power of the State. By contrast, targeting for policy purposes specific features in the attributions of the State may help individuals rediscover the importance of their role and responsibilities within the family. In this case, the disarray is viewed as a crisis not of the family within the society, but of its consciousness.

Stability is of the essence. Ways to restore it should be found and studied. What has been done by the governments or private organizations? What have been the objectives, the strategies and for which results. It appears that the traditional measures do not apply anymore to the manifold family. Imagination is likely to be the last resort.

[Back to top]

Section III: The Impact of the Technological Revolution on Families In Developing Countries

I. Background

In every society the family is the primary unit around which society is organized. The word 'family' in many developing countries has a connotation different from that attributed to it in Western industrialized countries. While in industrialized countries a family is constituted of a man, his wife and their children; in many developing countries, particularly those in Africa, the family is made up of a man, his wife/wives and a number of their close blood relations in the same household. It is not uncommon that it would be composed of three generations. The traditional African family is based not only on direct blood ties, but also on several individuals' awareness of being descended from the same ancestor.

In a traditional family of around 6-10 people, sometimes more, everyone has a role to play for the survival, security, and wellbeing of the family. This includes children above a certain age, usually around 6-7 years old. The individual roles are inter-linked to sustain the family as a social unit. Age is often the decisive factor in

determining ones role, rights, and duties within the family. The family depends largely on the productive efforts of its members to sustain itself.

The main role of the family is in ensuring the survival, protection, and development of children and to support each other socially, morally and economically.

The family as an institution is changing progressively from the traditional concept of a family to a much smaller unit. The pace of change is quickening and all aspects of life are being affected at once. The consequences are longer-term and they are global. This is why their consideration is so urgent.

Education, economic activities, infusion of cultures, religion, migration, urbanization, plus improvements in living standards, to mention only a few factors, all tend to loosen the traditional structure, to make people more individualistic. They have forced past ways, past customs and practices to adapt, particularly as regards family structures.

The growing economic independence of women has widened their margin of negotiation with regard to domestic rights and responsibilities. Couples have had to adapt to a more symmetrical relationship than was common in the past. The stability of this relationship has come to depend more on compatibility between life plans and the similarity of expectations concerning each partner's role than on adherence to traditional family models.

Undoubtedly, the current changes in family life revolve around the evolution of the status of women. Regardless of what type of union is formed, its viability and stability hinge on the progressive broadening of women's opportunities for participation in public life and the spread of values that question the traditional division of labor within the family.

Demographic and technological factors and changes in occupational, educational and service structures have helped to broaden women's opportunities for participation in public life. In the demographic sphere, lower fertility, longer life expectancy and the concentration of production in the initial phase of conjugal union has enabled women to prolong the period during which they have no reproductive responsibilities. Consequently, women have more time for work outside the home. This increase in women's free time was boosted, on one hand, by rapid advances in domestic technology that cut down considerably on the time required for household chores, and, on the other, by the expansion of social services related to the care and education of children.

At the same time, the notable increase in women's levels of education have enabled them to take advantage of the new employment opportunities.

Despite the dearth of data on families, five global trends in family formation, structures, and function can be inferred from the research record of the last two decades:

i. **Women's average age at first marriage and childbirth has risen, delaying the formation of new families;**
ii. **Families and households have gotten smaller;**

iii. **The burden on working-age parents of supporting younger and older dependants has increased;**
iv. **Women's participation in the formal labor market has increased, shifting the balance of economic responsibility in families; and**
v. **The proportion of female-headed households have increased.**

These trends are not evident everywhere, nor do they tell the whole story of modern family life. They do reveal some of the forces that are shaping the experience of many mothers, fathers, and children in the developing world today and suggest ways in which family aspirations and survival strategies are changing.

Impact

The impact of modern technology on the family, can be recognized by a review of the changes in the roles and contributions of each family member to the family's well-being. Some of the changes are a result of an infusion of cultures. These should be differentiated from those directly resulting from technological advances.

In trying to assess the significance of the changes in family life brought about by technology, we must recognize the fact that these changes are gradual and that there are significant variations between countries due to cultural differences and between those who are economically comfortable and those who are economically deprived.

The topic of technology and family is significant for a variety of reasons. Modern technology is directly related to family issues and social problems. It brings new opportunities and new challenges to individuals, families and to the society at large. It offers both opportunities for developing countries as well as developed ones. The diffusion of technology is modifying family relationship, attitudes and values. The technological revolution has also impacted on the structure and functions of the family in many societies.

Twentieth-century technology, particularly that of the last two to three decades, has radically transformed the traditional household. Tasks which traditionally took hours to accomplish can now be done in a matter of minutes. With this reality, wives are able to seek employment outside home or take on outside work which can be done at home.

The advances in modern technology have meant that basic economic pressures are being taken off an increasing number of people, living standards are rising, bringing with them the prospect of a more secure, and more satisfying family life.

There is a new kind of companionship reflecting the rise in the status of the young wife and children which is one of the great transformations of our time. There is now a new approach to equality between sexes and, though each has its peculiar role, its boundaries are no longer so rigidly defined, nor performed without consultation – husband and wife are partners.

I. Education, Communication, Information Technology and Families

The African continent has the least developed telecommunication network in the world. The telecommunications infrastructure is insufficient, not well adapted to the need of the African environment and unequally distributed on the continent. Equipment is concentrated in urban areas and not in rural zones where most of the population live.

The current status of the development of electronic communication networks – the Internet as well as other networks such as, BitNet, FidoNet and Unix to Unix copy (UUCP) present the four main types of networking connectivity in Africa.

The most recent survey shows that 40 African countries have full connection to the Internet. These countries are mainly located in the north and west of the continent and South Africa. A full internet connection means that users can take advantage of networking services such as e-mail, conferences, newsgroups, distribution lists, remote log-in, File Transfer Protocol (FTP), gopher, Wide Area Information Servers (WAIS) and the Web. Other countries are also connected to other networks such as BitNet, Fidonet and UUCP with which an Internet connection is possible.

The Bitnet network offers three basic communication tools: messages, ftp and electronic mail. The electronic bulletin board can be used interactively. BitNet is connected to other networks such as the Internet. In Africa, Egypt and Burundi are the only countries connected to BitNet.

The FidoNet network was established in 1984 to support electronic mail and the newsgroup service between different Bulletin Board Systems (BBS), with an attractive price. More than 2500 computers are connected to the Fidonet network. FidoNet uses the traditional telephone network as a communication tool between computer equipment wit networks. FidoNet Systems are batch based store and forward technology widely used in Africa because they offer a low-cost networking platform optimised for use on low-quality phone lines. FidoNet systems are not Internet – upgradeable, but are connected to the Internet and to the UUP Network. In Africa, FidoNet is mainly used by NGOs, and is only available in Eritrea and Rwanda.

UUCP is widely used in Africa because the system makes possible an easy transmission towards the TCP/IP protocol, which provides direct connection to the Internet. In other words, UUCP systems are TCP/IP compatible and Internet upgradeable. The UUCP technology is well adapted to the African communication infrastructure. The UUCP network is able to work with the simplest equipment, with bad telephone lines and on different types of networks. The main networks that use this technology are R10 in Francophone Africa and UNINET-ZA in Southern Africa.

The following briefly presents the main Communication Networks in Africa:

Health Net: Health Net is a computer network for health care workers administered by Satelife, an international non-profit organization based in the USA. The use of low-Earth-Orbit satellites allows an affordable transmission and share of electronic mail and publications. Ground stations are operational in Botswana, Burkina Faso, Cameroon, Eritrea, Ethiopia, Gambia, Ghana, Kenya, Malawi, Mozambique, South

Africa, Sudan, Tanzania, Uganda and Zimbabwe.

Green Net: Green Net is the network of a non-governmental organizations (NGO) member of the Alliance for Global Communication (APC). The network is based on FidoNet technology. The Fido Gateway of GreenNet (GnFido), with the 'store forward' technology allows access to basic services of the internet (e-mail), GreenNet works conjointly with other networks helping the development of local initiatives like HealthNet and SDN participate in training programmes with Capacity Building for Electronic Communication in Africa (CABECA). The main correspondents of GreenNet come from NGOs located in South Africa, Botswana, Ethiopia, Gambia, Ghana, Kenya, Mozambique, Uganda, Senegal, Tanzania, Tunisia, Zambia and Zimbabwe.

All networks presented here are important technical achievements currently available in Africa. They bring together a wide variety of users and point the way towards the information superhighway.

More developing countries need to join one or other of these networks in order to benefit from information technology so vital to a country's development. The importance of sharing information at all levels cannot be over-emphasized. Access to information sources by decision-makers and by different members of society is the essential element in understanding and furthering the concept of sustainable development.

The initiatives and resolutions taken by the different academic and research institutions, governments, NGOs and private companies show the fundamental role of information and networking communication technologies in the development of social, cultural and economic environment. These technologies have become essential in the acquisition of knowledge, the exchange of ideas and the development of individuals and societies. In a global economy based more and more on knowledge, and in an information age society, technologies of information diffusion become important as any project dedicated to health, education and research. These projects, and the sustainable development of developing countries, can be achieved with the creation of communication networks, which provide a way to spread and share vital information in all sectors of society.

Digital technology systems have introduced a new communication medium, which is capable of assisting with the broad range of activities that together constitute the human and institutional dimension of development.

Digital systems for public use have far reaching implications. Their newness will effect economic activity through employment generation in their own establishment and through the new market opportunities that they will create for entertainment, banking, and other services, advertising, distance learning and so on. They will also affect economic activity, a) by means of their capacity to create and improve marketable skills, b) by increasing efficiency through their management applications, and c) by bringing into the marketplace many of the hundreds of millions of people who have been at the fringes of economic activity to date.

One might ask, what are the effects of IT in third world countries. Information systems, combining the communication capability of telephony and broadcasting, and the interactivity, processing, and multi-media capability of the computer, introduce new tools with enormous potential for assisting a wide range of critical human and institutional functions for development.

Education

Human development requires, among other things, considerable investment in education, health and nutrition. The result is a healthier and better-educated population that is capable of being economically more productive.

Educated people use capital more efficiently, so it becomes more productive. They are also more likely to innovate – to devise new and better forms of production. Moreover, they spread the benefits to their co-workers who learn from them and also become more productive. Thus the rising level of education causes a rise in the efficiency of all factors of production.

This helps to explain part of the disparity in income between rich and poor countries. It also partly explains why poor countries are not catching up or are even slipping back. They are failing to make investments in human capital that can raise productivity and enable the workforce to adopt new technology.

A country requires an educated workforce – both people with higher skills to carry out the research and those with more basic skills to put the results (of research) into practice. The new growth theories thus confirm the human development position that the driving force of all economic growth is people.

Networks allow the contribution of new educational sources, such as database, searching for class material, of discussions and exchanges between students and teachers in the same country or in another country, that is the development of remote education. These new technologies already have an important educational role in Africa, where schools and the education system are in crisis and where the level of teaching is necessarily low. These technologies are changing and challenging the ways of learning, and the acquisition of knowledge becomes more dynamic, creative, universal, electronic and interactive.

The development of electronic networks is preparing the African nations to react and to participate more actively in the fast changing world economy where the flow of free information and ideas is important and influences all sectors of development and society.

Information and communication play a big role in formal and informal education. Communicating information quickly and cheaply to a large number of people at the same time, is an effective way of educating, not only the masses, but can also be used to introduce or upgrade new skills to trained workers.

In some countries emphasis is put on the quality of teachers' training and the services they render. But experience has shown that the use of new technologies in teaching is expected to yield better results. Learning is continuous and skills have to be upgraded

constantly to cope with volatile labor market conditions. Lack of new skills creates unemployment.

Education and acquisition of skills are a priority area for the development of developing countries. Present traditional methods of teaching are insufficient and costly. In order to improve the situation there is a need to resort to new technologies.

There is a great need to bring developing nations into the information age to stimulate development and economic expansion.

At the school level, various technologies and aids to learning have evolved: Blackboards, textbooks, laboratories, calculators, film, radio, Television and now computers. These technologies have almost invariably been used as add-ons to the conventional, teacher –centred system. There are exceptions. In the Radio Learning Programme in Kenya, for example, the children respond directly to instructions from teachers speaking, over the radio. In other distance learning programmes, radio, television, printed and tape recorded materials are used in various combinations as the media of instruction. Students interact directly with instructional programmes – instead of the technology being used as a teacher aid. The role of telephone and teleconferencing are expanding too. These demonstrate that different approaches to formal learning are possible, but they remain at the periphery of the mainstream of conventional approaches to education worldwide. They have not altered the traditional system.

The open university in United Kingdom and replicas of this model currently being developed in a number of countries, with their extensive use first of radios and now of television, have introduced a technological revolution in the subset of education with which they deal. Computer-based learning is now being added, though at a limited scale due to lack of a country-wide power system. As a result, though student numbers are remarkably growing, this and other distance learning programmes affect only a small fraction of learners. Developing countries can adopt some of these methods where circumstances permit – power supply, equipment, etc.

II. Employment, Technology and Families

The most fundamental of all economic opportunities, employment or work, provides people with incomes that enable them to establish command over a range of goods and services needed to ensure a decent standard of living.

By employment here it is meant all ways of securing a livelihood, not just wage employment. Many people in developing countries work on their own farms or are otherwise self-employed, often in the informal sector. Nor is work limited to paid employment. People engage in many unpaid activities in the household or community that make a valuable contribution to society – raising children and caring for the sick and the elderly or participating in voluntary work.

People value their work for many reasons beyond income. Work allows them to make a productive contribution to society and to exercise their skills and creativity. It brings strong recognition that fosters self-respect and dignity; and it gives them the

opportunities to participate in collective effort and to interact socially.

Work is also closely tied to a way of life, and people elect to do one kind of work rather than another as a life choice. The Masai of Kenya manage their cattle – that is their 'job', but it is also a way of life. Moreover, the right kind of employment opens a broad range of opportunities – empowering people not just economically but also socially and politically. For women, earning an income is often critical in gaining more say in decision-making in the family and community.

In this section, we are mainly concerned with paid employment which is easily quantifiable and can be easily related to a country's GNP.

Unemployment is, on the average, very high in developing countries. Many developing countries are struggling to expand employment fast enough to keep up with their growing populations, especially in urban areas. A large number of developing countries, with the notable exception of the fast-growing economies in East and South-East Asia and a handful of others, unemployment problems are acute although different in nature. Unemployment ranges widely, both within and between regions – from 2 per cent in the republic of Korea to 19 per cent in Trinidad and Tobago.

Official unemployment statistics in most developing countries, however, have limited meaning, because much of the employment is in rural areas and in urban informal sector, both of which are poorly covered in official statistics. However, open unemployment is severe and growing many countries, particularly among the youth. In Kenya it has risen to 29 per cent – compared with an average of 10 per cent and in Algeria 21 per cent.

The rapid urbanisation taking place creates strong pressure for employment creation, particularly for the youth. In many cases of jobless growth, lots of employment was being created, but not fast enough to match the rapid growth in the labor force – such as India, where employment expanded by 2 per cent, Pakistan 3.5 percent, Colombia 3 per cent, and Burundi 2.7 per cent. Many countries that generated jobs with growth and productivity increases also had high rates of labor force expansions, such as Botswana 3.4 per cent, Malaysia 2.9 per cent and Chile 2.7 per cent.

Productivity improvements are necessary for both sustained growth in GDP and wage increases. Productivity increases were registered in almost all countries that achieved growth with opportunity expansion. This is an ideal scenario, sustained economic growth contributes to opportunity expansion, reducing unemployment and spreading productivity gains among the growing number of the employed. But productivity also rose in some countries that experienced jobless growth, such as Columbia, India, Pakistan, Sri Lanka and Zimbabwe, among the developing countries.

In the rural sector, technological innovation, imparting new skills and scientific methods in agriculture, create economic growth and contribute to opportunities expansion, reducing unemployment.

Technology also promotes job creation by fostering countless small enterprises. It aids economic growth, and sustained economic growth contributing to opportunity

expansion, and thus reducing unemployment

Installation of generators at strategic places in rural areas would go a long way in enabling families to benefit from new technology, through creation of new jobs in small-scale factories.

Technology creates jobs, new industries are formed, new services emerge all the time facilitated by technological change. Distance working now allows forms of work in rural areas, which can be based on family and village units. The new telecommunications make such home working possible. Technology increases production and therefore creates employment.

Expanding employment opportunities to meet people's new needs and aspirations is among the top priorities for human development in the years to come. It will be a large and daunting task. Opportunities must be expanded enough to reverse the tide of growing unemployment, absorb the growing labor force and improve the productivity and incomes of the poor. In the past decade only a quarter of countries achieved satisfactory expansion of opportunities, minimizing unemployment and raising wages and productivity. Technological innovation hold the best hope to achieve this. Information technology is rapidly becoming a key to the future development of the world economy, and as such, no country can afford to be left behind.

It is a commonly held view that technology destroys jobs as machines replace humans. But this does not always stand up to facts. There are two sides to this new technology coin: anxiety and job loss on the one hand, and the opportunity for flexibility and development of new skills on the other hand.

As indicated above technology increases production and economic growth. Sustained growth contributes to opportunities expansion, reducing unemployment. Technology offers work opportunities by stimulating local and small-scale industries. While some jobs may be lost, other alternative work and employment opportunities are created. Rather than destroying jobs, technology offers new opportunities.

With the trend towards automation of both factory and office, what is the prospect for jobs and quality of working life; one may ask, does it spell automatic unemployment? No! New service industries, or for that mater, manufacturing jobs open up as technology expands. Equally one might wonder why people mechanize and automate factories, farms, offices, etc. The answer is to save costs, raise productivity and also to be able to compete on the same level.

The arrival in the real world of robots linked with artificial intelligence raises another range of questions as machines become more like humans.

III. Health, Basic Social Services, Technology and Families

The state of health in developing countries may be described as poor or very inadequate; but in the last two decades or so, there has been marked improvements nearly on all fronts, though much has still to be done. During this time we have seen the eradication of small-pox in all countries, a virtual elimination of poliomyelitis,

(there are now 145 countries completely free of the disease), leprosy is steadily being defeated and should no longer represent a significant public health problem in the next few years. There has been an effective measure of control of many communicable diseases, and a marked improvement in the field of maternal and child health. There has also been a general improvement in health services, particularly in immunization programmes, supply of clean water, and childcare programmes. There have equally been improvements in public health services, which include sanitation, food quality, and the environment. In spite of all progress made in improving public health, much remains to be done to achieve a reasonable level of public health. Perhaps a glance at the health situation might be appropriate at this juncture.

Fertility

Women are having fewer babies. In 1970, they had an average of 4.7 and the average declined to 3.7 by 1980, to 3.2 by 1990, and is now 3. Increasing use of contraception is the main explanation. In 1995, about 140 million babies were born, 16 million in the industrialized world, 25 million in the least developed countries, and 98 million in other developing countries.

Child-bearing for a significant proportion of women, particularly in Africa, continues to be a life threatening undertaking, and raising the children is a full-time job; particularly in the very hostile environment that threatens a child's life. While a lot of progress has been made in reducing the levels of maternal and infant and child mortality, the reality of the situation is that the death of parents, spouses and children is an experience that many developing countries are well acquainted with. Mortality rates among all age groups continue to be the highest in the world.

Child Mortality

Defined as the probability of dying by the age of 5 years, the global average in 1995 was 81.7 per 1000 live births; 8.5 in the industrialized world, 90.6 in developing countries, and 155.8 in the least-developing nations. Of more than 11 million such deaths in the developing countries, 9 million have been attributed to infectious diseases, about 25 per cent preventable by immunization.

Historically, mortality among infants and adults alike – was a much more bizarre experience in the face of poor hygiene, ignorance, poverty, environmental hazards, poor medical facilities, etc. Little wonder then that on average families produced several children just to ensure survival of a few.

Mortality

The developing world's death rate has declined sharply from 20 per 1000 population in 1960 to about 9 in 1995, due to mortality reduction particularly in the young age group. The least developing countries lag about 25 years behind other developing nations in the decline of death rates. The rate is highest in Africa.

On average Africans expect to live no more than 50 years, perhaps a little more for women and a bit less for men. Sadly also 10 per cent of pregnant women lose their lives and those of their unborn children at delivery. Such is the devastating experience which families have to live with.

Life Expectancy

Globally, average life expectancy at birth in 1995 was more than 65 years, an increase of more than three years since 1985. The life expectancy gap between the industrialized and developing countries narrowed from 25 years in 1955 to 13.3 in 1995. But the gap between least developed and other developing countries has widened from 7 years to more than 13 years in the same period.

Emerging Diseases

Emerging infectious diseases are those whose incidence in humans has increased during the last two decades or which threatens to increase in the near future. The term includes newly appearing infectious diseases or those spreading to new geographical areas. It also refers to those that were easily controlled by chemotherapy and antibiotics but have developed anti-microbial resistance.

The most drastic example of a new disease is AIDS, caused by the human immune deficiency virus (HIV), whose existence was unknown until 15 years ago. About 26.6 million adults could be living with HIV/AIDS by the year 2000. New breed of deadly hemorrhagic fevers, of which Ebola is the most notorious, has struck in Africa, Asian and Latin America. Ebola appeared for the first time in Zaire and Sudan in 1976 and has emerged several times since, most notably in Zaire in 1995, where it was fatal in about 80 percent of cases.

Much of the improvements in people's health in developing countries can be attributed to the spreading of knowledge of hygiene and other educational programmes at village level; expansion and improvements in social services, application of technological innovations and better communication services. The man, woman, and child in developing countries today are better off health wise than they were two decades ago.

Technology

Technology and scientific innovations in medical science, has been the main tool in bringing about such improvements. Some of the technological devices in use are simple. Information technology played a big role in making the population aware of their problems and how they could be solved. Communication through mass media – radio, T.V., Video, Computers, etc., have brought thousands of people in remote areas to 'School' within their own houses, where they have acquired the vital knowledge of improving their lot. As this is done without them leaving home, it is cost effective.

In remote regions without any doctors, use of bear-foot 'doctors' and nurses, who use simple technological methods, have also been very effective in their making an impact on health problems. In this process, simple remote diagnostic techniques have been helpful in advising and supporting those who may only have a very rudimentary medical knowledge. Through a two-way communication system doctors can be consulted on particular difficult cases, and in a feed back fashion, advise on further simple checks that might be necessary and an appropriate form of treatment is given. Technology can be used to increase the skill of field workers.

The ability to transmit live ultrasound images down the telephone line – called remote fetal scanning, enables doctors to do distance diagnosis as precisely as if they had carried out the examination in person.

With the enlarged capacity of network technology, that allows the transmission of audio and video signals, doctors are able to 'visit' patients in remote locations. In, addition, the capacity to put medical images on the network will enable physicians in various clinics to view them simultaneously.

The trend in this field appears to point to more sophisticated technological innovations for diagnosis and treatment of hitherto untreatable diseases, and to explore new areas where technology will enhance human life to a higher level.

Social Services

The capability to lead a healthy, well-nourished life or to give birth under safe and healthy conditions depends on access to health services. A well functioning society provides its people with basic opportunity. Many developing countries are unable to provide this service to their population except for a few in urban areas, e.g. in Sierra Leone 90 per cent of the urban population has access to health facilities compared with only 20 per cent of the rural population.

Many developing countries are a long way from providing universal access to basic social services. One of the main problems, of course, is finance. It is estimated that meeting these needs by the end of the decade would require an extra $30 to $40 billion a year for basic education, basic health care and nutrition, low cost water supply and sanitation and reproductive health.

Application of technological measures may assist in maximizing the benefits from limited resources.

Highlighting the effects of technology on social services in case of Africa, we note that electric networks allow Africa access to information that was not previously available on the continent. Database centers of scientific documentation and publications can be browsed, searched, etc. The best libraries in the world are then available with a few key strokes from any location on earth, allowing the acquisition, use and exchange of information.

IT programmes have contributed immensely in bringing about an amelioration of the health situation in developing countries. Although the problems still exist, the impact brought about by IT is significantly evident.

The mass media in conjunction with health workers have demonstrated at the local level how improvements in the situation can be effected. Maternal and child health programmes supported by necessary equipment, have been mounted with the participation of the local people. Radio, T.V., Video, etc., have been used to good effect in these situations with good results. Locals have been taught how to obtain and use portable water, how to prepare baby's meals, and how to lead a healthy life generally. All this has gone a long way in improving the health situation, particularly in rural areas where medical services are almost non-existent or insufficient.

The health sector will take advantage of these new communication tools. Where distance and isolation of population are predominant in Africa, applications of telematics in tele-medicine and health care services will improve services to patients and will provide a better and more effective way to control the cost of these services. Patients, professionals, and isolated medical and health staff will be able to receive and have access to information and consultation. The following shows some of the services available with the emergence of these new technologies.

- **telediagnostics by specialists,**
- **access to medical knowledge database,**
- **liaison between medical centers and patients,**
- **development of medical information systems allowing a better management and therefore an improvement of health administration,**
- **access to international organizations, e.g. WHO,**
- **creation and installation alert and warming systems.**

The development and installation of new information technologies implies a level of financing that sometimes goes beyond the available resources of developing countries, particularly in Africa. Dr. Ahmed Laouyane of ITU sees in the financial issue on networking development a new type of co-operation between countries of the south and countries of the north. This new environment gives rise to new types of relations, from assistantship to partnership, with greater participation and investment of private companies. However, the examples of Zambia and Ethiopia, among the least developed countries, show that the relationship between economic level and connectivity is not always related. The dedication of some individuals, the availability of funds and loans and, above all, a change of perception among political leaders towards the impact of information technology are essential elements contributing to the appearance and development of electronic networks in the poorest nations.

On the question of cost-benefit consideration, it is quite evident that technology saves a lot of money compared with the traditional capital outlay to achieve the same benefits.

Summary

The impact of technology on the family may be summarized as:

a. **The liberation of the housewife from domestic drudgery, transforming and simplifying the means of preparing domestic tasks, and creating new opportunities for work outside the home, including pursuing interests outside**

the home. According her better health and medical care, better nutrition, and better environment.

b. The man/husband as a farmer (the main activity in developing countries) has benefited from the use of machinery for hitherto long hours of menial work. He has been able to increase his production two or threefold through the use of better farming methods, e.g. fertilizers, improved seeds and use of pesticide, etc.
c. The family is better informed and more knowledgeable through improved dissemination of information – Radio, T.V., Video, Cassette, etc; and have time and facilities to acquire new skills.
d. Family shows improvement in the quality of life due to acquiring new knowledge and skills, better feeding, and health care, and better environment.
e. Children have better facilities to learn to improve their knowledge, to participate in recreational activities, and to learn new skills. They eat better food and drink clean water, and have better opportunities in life.

[Back to top]

Annex

Scenario 1. Job Creation/Distributed Work

The use of new technologies to distribute work – including manufacturing – to regional and local levels will be considered. Apart from stimulating local and small scale economies it also reduces the environmental and other costs which arise if products are mass produced in one area and then subsequently widely distributed.

This project would identify products and services which could be produced locally and even at a village or family level and which would incorporate aspects of "learning and earning" organizations. Those involved would not only learn the production procedures and the use of some basic equipment. They would also learn how to use the communication technologies at least a basic level.

Scenario 2. Jamaica

In Jamaica, many mothers have to go abroad to work to maintain their families. The consequences for these families are very serious. One of the schools in Kingston has produced reports on the depression, anxiety and delinquency triggered by the absence of a mother. This absence is made more serious because the society is matriarchal. A charity is working amongst the children to try and alleviate their problems.

New Technology could be used to addressed this problem if only on a small scale. The mothers who are abroad could be contacted and a serious effort made to find distance working for them which they could undertake from Jamaica, thereby allowing them to return to their children. Alternatively, where mothers are considering moving abroad because their work prospects are poor in Jamaica, a programme could be set up to introduce them to new forms of work based either on new technologies or forms of distance working.

Scenario 3. India

In many parts of the world, traditional forms of agriculture are giving way to more mechanization. This has both its positive and negative features. One effect however, is the break-up of the family units which historically have undertaken this type of work in many parts of the world. Whilst the process is of a general kind, the consequences are often region-specific and need to be considered on a district-by-district basis.

Many forms of alternative employment can be considered. Information Technology could be used to indicate any potential that may exist for organically farmed produce for which there is a growing market) or crops yielding a higher added value. In this latter connection, instead of selling the basic material to large scale manufacturers and multinational companies, small scale 'on farm' processing could be undertaken. Advice could be given on setting up, the quality control procedures required, the available markets, outlets and linkages that can be made to effect an "economy of networking".

The network could also provide information on mutually supportive, non exploitative international trade as exemplified by "fair trading". The information provided through the network would also indicate non food products which could be produced on a small scale basis but which would be compatible with local skills and culture.

Scenario 4. Africa

Several countries have been supporting projects which might broadly be described as "barefoot doctors and nurses". Some of the projects funded by France and applied in Africa provide interesting examples and have contributed to the improvement of family health and well being.

In more remote regions, simple remote diagnostic techniques could be helpful in supporting those who may only have a very rudimentary medical knowledge. This could be supported by simple interactive systems which could be interrogated about particular symptoms and in feedback fashion advise on further simple checks that might be necessary and on the appropriate form of treatment.

Scenario 5. Several Countries

Voluntary and 'not-for-profit' agencies can provide advice on new products and

services available. Many of these would be appropriate for developing countries and can be accessed via the Internet or other form of communication. In some cases the products are fully commercialized in one part of the world and instead of exporting them it would be highly desirable to manufacture them locally. Manufacturing know-how and quality control details are available and many of the are very simple devices which could be made at a village or family level. Their production could also be linked via new technology to details of domestic and overseas markets as well as networks of appropriate outlets.

Scenario 6. USA, Canada

In many parts of the USA and Canada there are significant social, economic and cultural problems for native Americans on reservations. These in turn result in tensions within families and often lead to family break-ups with high rates unemployment, depression and alcoholism particularly amongst younger men.

The problems are by no means uniform and differ greatly from nation to nation (tribe to tribe). Much useful work is already underway but much more could be done in an educational sense to create a symbiosis between the languages, culture and outlook of native Americans with the potential for a sensitive use of new technologies and communication systems.

Scenario 7. Europe

In Europe there continues to be a hemorrhagic of young people from rural areas as they move to the large cities and urban connurbations. In many rural areas only the elderly are left.

Apart from the break-up of families and the economic losses, cultural impacts are significant with some of the lesser used languages and dialects in remote areas going into decline. Local customs, traditions, festivals and music are also in decline. In several countries, examples already exist which attempt to address these issues and which could be enhanced and built upon using new technologies in innovative ways.

These examples use new technologies for outreach activities in the very small towns and villages. There are also facilities for distance working as well as learning and it is hoped that this will contribute to producing interesting sustainable jobs for families in rural areas.

Scenario 8. Technology for the Elderly

Demographic changes are now sweeping through most industrial societies. In Europe, the percentage of people over 65 is increasing dramatically. For example its 16.4% in Norway and 18.3% in Sweden.

The complexities of industrial society mean that three generation family contact and

joint living is much more difficult than in the past. Furthermore, growing numbers of older people are being institutionalized as they reach an age when it is difficult to look after themselves entirely independently.

Various new technologies and communication systems are being developed which help to maintain inter-generational contact. Also, new technologies and the design of kitchen and other equipment, means that older people can maintain their dignity and independence much longer than would otherwise be the case.

Scenario 9. The Village Shop

Throughout most of the developed countries there is concern at the decline of villages as economic, cultural and social entities. The Village shop used to be the one focal point for all three of these. It was often a "lifeline" for elderly citizens who no were longer able or willing to drive to the nearest town or supermarket.

It is not proposed to examine here a complex of factors which brought about this situation. It is clear that food processing technologies, modern refrigeration and storage facilities linked to the computer based distribution systems which make supermarkets possible had certainly been a contributory factor.

In 1977 82% of England's rural parishes were without a food shop. Of those that remain as many as 3,500 are at risk of closure. In an attempt to reverse this, citizens in some of the villages – e.g. Oaksey in Wiltshire – are using a model constitution for a "Village Shop Association" with every villager invited to buy a share. In cases such as this and more generally, new information technology can be used to create virtual village supermarkets.

Techniques such as "Just in Time" Technology, originally developed in the automotive industry, could be used via simple information networks to provide a wide variety of goods to these village shops on a regular basis. These shops do not have the storage facilities or the capital to maintain a stock comparable with supermarket goods but by getting together they can create a virtual supermarket with a shared distribution network and 'same day' deliveries facilitated by mobile units. Such village shops can also function as village post offices, information centers for the local council and agents for a number of facilities such as dry cleaning, film developing, equipment hire, etc.

Scenario 10. NET Access

The internet can be used to provide information and highlight issues. This is already happening in a more general sense. The Afghanistan Women's Association has a web site providing a voice for women which is otherwise very difficult under the Taliban Government. A web site posted information about the attacks on ethnic Chinese women during the recent riots in Indonesia. There is a "rapid response" web site with information about police violence against more than forty million street children in Latin America.

In the same vein, the UN Family Unit could advise upon and support the setting up of special sites to highlight programmes and users of technology which would support the family in many different parts of the world. It could provide case studies of positive action that is being taken.

[Back to top]