CHAPTER 2

REVIEW OF LITERATURE

Research must start with facts and end with facts. The formulation of research problem is on the basis of theoretical perspectives and review of past research. It helps the researchers to get acquainted with subject matter and channelise his efforts in desirable direction. It is the basis for formulating desirable hypotheses. Hypotheses are checked against observations and generalised, and the generalisations support, contradict or suggest the modification in the subject matter. Therefore the references available from various sources pertaining to present research topic have been reviewed. Important institutions visited for this purpose are, libraries of Amravati University and Dr. Punjrabao Deshmukh Krishi Vidyapeeth, Akola. Libraries of NCMRT, Solan, H.P., NIN, NIRD, NARM, Hyderabad, (A. P.), IGNOU, Amravati study centre, Shri Shivaji Agriculture College and Shri Shivaji Science College, Amravati.

Critical and exhaustive search of the literature emerged out that, although a large number of studies have been made on oyster mushroom biology but quite a few studies were conducted on extension or training efforts. However an attempt is made to review the important studies. Review has been divided in the following sections and subsections as follows.

- Training
- Training evaluation
- Oyster mushroom
- Mushroom training
- Constraints in mushroom training
- Mushroom cookery
- Independent variables
- Relationship of independent variables
2.1 Training

The review of past researches on definition on training, training methodology is presented in this section. An attempt has been made to exhibit the theoretical subject matter and relevant studies.

Steinmetz (1967) defined training as “a synonym for all of the forms of knowledge, skill, and attitudinal development which adult need to keep pace with the accelerating life involvement and the enlarging concept of man’s capabilities.”

According to Folley (1967) “training is an overt process of sequence of experiences the trainee is exposed in some more or less systematic way to certain materials or events.”

Oatey (1970) defined training as “any activity, which deliberately attempts to improve a person’s skill at a task.”

Hasseling (1971) defined “training as a sequence of experiences or opportunities designed to modify behaviour in order to attain the stated objectives.”

Goldstein (1974) has traced back training to begin with the assessment of training needs, based on empirical basis of learning process, juxtaposed with environmental requirement of trainees.” He also offers various institutional approaches such as the experimental control procedures, the programmed instruction procedures and the like suited for specific situations.

Hamblin (1974) have defined training as “any activity, which deliberately attempts to person’s skill of a job.”

Lengrand (1975) pointed out that the training is viewed as “lifelong education process and it is essential for the self-development of individual. This will result in increasing self-realization. The life long education leads a human being so as to maintain the continuity of his opportunities and training throughout his life.”

Chaturvedi (1979) mentioned that broadly, “training aims to maintain and increase the employee’s effectiveness in his present job, prepare him for promotion by stimulating his potentials and develop his skills and knowledge in greater organisation effectiveness.”

Larry Browning et al., (1979) discriminates between education and training and reported that, education prepares one for the life he might live, training equips one in the life he is now living.
The manpower services commission’s Glossary of Training Terms (1981) defines “training as a planned process to modify attitude, knowledge or skill behaviour through learning experience to achieve effective performance in an activity or range of activities.”

Virmani (1985) in his book stated that the functional definition of training is “acquisition of knowledge concepts, skills, attitudes and term development has been used to denote its application to the job for improvement in the executive’s job performance.”

The International Labour Organization (1986) defines training as “activities which essentially aim at providing the skill, knowledge and attitude required for employment in a particular occupation, group of related occupations or for exercising a function of any field of economic activity.”

Gaikwad (1988) says that training is ‘reactive’ when it merely respond to the demand of immediate nature of a given strategy for development and ‘proactive’ when it creates awareness of new opportunities and potentials and consequently helps in formulation of new policies and programmes.

Department of Technical Co-operation for Development (DTCD) USA. (1989), defined that “Training is a building process. To reflect this, a good course is organized in ascending order of complexity. Often a test of competence, prevent progress to a higher part of the course before the student has mastered the contents of a lower one. In this way the trainee’s knowledge can be developed systematically.”

Misra (1990) mentioned that training for extension persons as a planned and systematic efforts to increase knowledge (k) improve skills(s), inculcate appropriate attitude (A) and develop other attributes (Os) in extension personnel to enable them better serve their clients. T = f( KSAOs)

Misra (1990) described ABCDEF of training for extension personnel.
A Action- Training must prepare extension personnel for action.
B Budget- Search for cost effective training strategies and use of locally available resources.
C Content- Practice oriented inter-disciplinary curriculum.
D Diligence- No short cut is available for better results, hard work is required.
E Extension- Aim of training intervention is to make extension service perform better.

F Farmer- Farmer is the first motto of extension personnel

Intolia et al., (1993) have defined training as “a process by which individuals are helped to acquire certain specific skills related to given operations and context. It ensures mechanical and methodical replication of certain roles operations; without further training for changed contents, a trainee will not be able to engage in further self training or acquiring higher order values required for changing needs or for developing integrated personality.”

Das et al., (1997) studied the role and status of women in the society. Particularly in rural areas and observed that there is an urgent need to lay more stress on need based training programmes and to improve technical competence of women in various fields to make them socially and economically independent by establishing group or individual entrepreneurs.

Masur et al., (1997) mentioned that the main purpose of organizing training programmes is to impart knowledge and develop new skills required for adoption of the latest technology and build up scientific attitude among farmers, farm women, rural youth, school drop-outs and other grass root level workers.

2.1.1 HISTORY OF TRAINING

Dhama and Bhatnagar (1985) stated that after 1959 trained graduates in extension education and rural sociology were available to the extension service and this marks a turning point in India’s extension service.

Miller (1987) stated that the history of the growth of the training, which accompanied the great industrial expansion, is fascinating. As early as 1809, the Masonic Grand Lodge of New York under the leadership of De Witt Clinton established vocational training facilities. Since 1825 manual training began in the United States.

Subramaniam (1988) pointed out that the basic ethos and model of training consists partly of an inheritance from the 18th and 19th century. France and Prussia superimposed the new techniques devised by American Management in this country.

Misra (1990) reported that the Second World War clearly established the efficiency of training. Due to its success in training military personnel, Post war...
period accorded an important place to training to public services. Since then training has gained on precedents momentum.

Sah (1991) mentioned that hectic efforts for management training were started after 1960.

2.1.2 TYPES OF TRAINING

Misra, (1990) stated that demand-oriented training is based on the needs of clients whereas supply-oriented training is based on what an extension service has to offer. He further categories training into four categories.

i) According to stages of carrier

ii) According to subject matter specialization

iii) According to level of extension personnel

iv) According to type of extension personnel

The specific stages of carrier mentioned as:

i) Pre-service training, ii) Orientation training, iii) In-service training,

iv) Induction, Portal or vestibule training, v) On the job training,

vi) Refresher training, vii) Re-training, viii) External training, ix) Overseas training, x) Training for professional qualification, and xi) Training by overseas experts.

2.1.3 IMPORTANCE OF TRAINING

Otani et al., (1989) reported that development of human resources plays an important role in economic growth. Expenditure on improving human capital appears to have a substantial effect on output growth as development of public and private human resources (education, health).

World Development Report (1990) stated that despite of shortcomings to execution of programmes, training continues to secure wide support primarily on the ground of its critical role in human resource development. It is regarded as an important resource for speedier socio-economic development and one of the key to reducing poverty.

Milheim (1994) pointed out that the effective, corporate training requires a number of interconnected steps, including need assessment, task analysis, media selection, material development and evaluation.
Jain et al., (1998) opined that the most important tools for popularizing technology are training and demonstrations. Training should be organized for the following objectives,

i) Creating awareness and interest in the technology.
ii) Developing skill among the user for application of technology.
iii) Encouraging rate of adoption of proven technology.

He also suggested that training should be organized from time to time, while planning training programmes, trainee should be grouped into different categories as per their entry level and need selection of trainees, location, duration, and conduct of training programmes must be given consideration for maximizing the output.

2.1.4 ASSESSMENT OF TRAINING NEEDS

Johnson (1967) described 34 methods for assessing training needs. i) analysis of an activity (prosess, job, operation), ii) analysis of equipments, iii) analysis of problems, iv) analysis of behaviour, v) analysis of an organization, vi) appraisal of performance, vii) brainstorming, viii) buzzing, ix) card sort, x) check-list, xi) committee, xii) comparison, xiii) conference, xiv) consultant, xv) counselling, xvi) in-basket, xvii) incident pattern, xviii) in formal talks, xix) interviews, xx) observation, xxi) problem clinic, xxii) research, xxiii) role playing, xxiv) self analysis, xxv) simulation, xxvi) skills inventory, xxvii) slip writing, xxviii) studies, xxix) surveys, xxx) test, xxxi) task force, xxxii) questionnaire, xxxiii) work shop, xxxiv) other ways.

Gupta (1982) identified training needs of farmers and suggested that bee keeping, rabbit rearing and mushroom cultivation was viewed as important training need areas.

Wexlay (1984) states that training needs assessment provides information on i) where training is needed ii.) What should be the content of training? iii.) Who needs the training within the organization? iv.) Certain kinds of skill and knowledge.

Misra (1990) opines that training needs assessment has hovered around three interrelated components namely; i.) Organizational analysis ii.) Task analysis, and iii.) Person analysis. He further stated that TNA provides information on i) who will organize the training? ii) where will it be organized? iii) will it be institutional or non-institutional? iv) availability of requisite facility? v) are resource persons of
requisite caliber? vi) who will finance training? viii.) what are the likely outs comes of training?

He further mentioned that the training needs are assessed at six level of aggregation namely,

i) Individual, ii) Group, iii) Organizational, iv) State, v) Regional, and vi) National level.

A number of methods for training needs assessment are available for different level of aggregation. He found that, two critical parameters circumscribe the training need assessment. The first is the national production priorities laid by policy makers and planners. And second is the farmer’s felt need for training.

Sharma (1990) stated that this is a challenge and herculean task before all of us; that how to make the enterprise remunerative and economically viable by providing all technical know how, managerial tips and adequate infrastructure to the desirous mushroom growers, so that mushroom production industry may be boosted. Hence, there is a need to have effective strategy for cultivation, training and resource management for improving the plight of mushroom growers. Further he defines Extension Education Strategy as a methodology which applied to change knowledge, attitude and actions of people for their betterment. To change the behaviour of the peoples is a complex mechanism, which can mainly be changed by deploying as effective extension education strategy in the social system.

Sharma (1994) reported the thirst areas in VIII plan that transfers of technology to the extension workers and conducting of training is the need of time.

The training should be organised from time to time while planning training programmes, trainee should be grouped into different categories as per their entry level and need selection of trainees location, duration and conduct of training programmes must be given due categorization for maximizing the output.

2.1.5 CURRICULUM DEVELOPMENT

Preciously developed curriculum is the need of structured training programmes for effective results. The review of the past studies guides for the curriculum development and enhance the effect of training.

Bloom (1979) described that taxonomy of educational objectives can be classified as, i) Cognitive, ii) Psychomotor, iii) Affective.
The educational objectives are said to contain six major classes as knowledge, comprehension, application, analysis, synthesis and evaluation.

Dixit et al., (1985) on the basis of their study of adequacy of coverage of extension education course contents in relation to the job of Agricultural Development officer in Haryana (n=120) have reported wide divergence between adequacy of course content and their suitability due to changed circumstances in extension.

Khemmani and Cook (1983) stated that there are two approaches to curriculum, a traditional approach and non-traditional approach. Traditionally there are four approaches as,

i) Subject oriented approach
ii) Teacher oriented approach
iii) Research oriented approach
iv) Technology oriented approach

The non-traditional approaches are,
i) Need based approach ii) student-oriented iii) problem oriented and iv) job oriented approach.

Khemmani and Cook (1985) also mentioned that media means equipment and material used to help trainees and trainer in the teaching / learning process. They categorized training media into three categories.

i) Non projected media – books, handouts, graphs, models, simulation, magnetic and flannel boards.
ii) Projected media - UHP, microfilm, movie, closed circuit T. V.
iii) Sound media - broadcast, radio reel, cassette, tapes etc.

Sim and Hilmi (1988) stated that a standard curriculum must specify the following components.
i) Course objective, ii) Achievement targets, iii) Course structure, iv) Assessment, and v) Course content.

Misra (1990) mentioned that a well-developed curriculum would not only stimulate the interest of trainees in training programmes but also sustain their interest. Such a sustained interest can help trainees to absorb the knowledge, skill attitudes, and experiences imparted during the training programmes.
He further opined that curriculum is required to develop primarily for two reasons. First, as need base approach to curriculum is preferred, it requires to be developed for specific Training course, secondly. New priorities appear necessitating curriculum development.

Misra (1990) stated that a training plan has five essential features, i) Comprehensiveness, ii) Consistency, iii) Result orientation, iv) Quantification, and v) Integration. He also described that a good trainer always keep watch over the learning behaviour, particular watch over learning plateaus and make extra training efforts to avoid it.

Sah (1991) mentioned that training system is a set of principles, which emphasises definition of objectives and specific designs of the means for accomplishing objectives.

Pretty et al., 1995; Chambers 1997, stated that an over simplistic application of participatory methods can easily lead to a devaluation of the scientists own legitimate role and perspective.

The definition of training explains the concept of training. Training is oriented for development of specific skills and knowledge of essential subject matter. Training helps to putting theory into practice and changed attitudes towards specific task, activity. The review on history to training shows that the concept of training has origined in 18th century and oriented towards vocational training post war period accorded an important place to training to public services. After 1960 hectic efforts started for management training and emphasis on training of extension personnel. This marks a turning point in Indian extension services. Further some studies noted significance of training in the content of human resource development. Misra (1990) in his report mentioned types of training. Past review of the studies encompasses the training methodology as assessment of training needs and method for it. Decision of objectives, importance of curriculum formation, training aid, and various training approaches to achieve the training objectives.

2.2 Training Evaluation

Training evaluation provides concurrent for proper understanding and appreciation of various underlying factors and specification of the variables and their
effects for upgrading the training programmes. The various aspects of the training evaluation are considered such as: methods of evaluation, tools for training monitoring and evaluation, and evaluation of management of extension training.

Chaney et al., (1967) evaluated effectiveness of training programmes singly and in combination. The performance was measured before and after training. The group who received training reduced defects by 32 percent. Those using the aids improved by 42 percent. Machine part inspector who had both the training and job aids achieved a 71 percent increase in accuracy in the control group there was change performance.

Lynton and Pareek (1967) summarized their own experiences as trainers discuss the training and evaluation process under the pre-training and post training phases with each having implication for training designs.

Hamblin (1970) defined that training evaluation means any attempt to obtain information (feedback) on the effect of training programmes in the light of that information. He (1974) has further defined that evaluation as an attempt to obtain information of feedback on the effects of a training programmes and to assess the value of training in the light of that information for improving further training programmes.

Treadway (1976) stated that quantitative evaluation methods are most useful and outlined as i) Participants personal characteristic. It has effect of training in areas as training knowledge, attitude, and skills. ii) Participants and organisation performance. iii) Return of training investment. He further suggested that experimental design for measuring training effect. The design is simple in that it requires a measurement of participant before training to establish the level of knowledge, skill, performance, and attitude to ascertain their new level of knowledge, skill performance, and attitude.

Data collection methods are questionnaire, paper-pencil test, performance test, simulations, and visual observations, rating forms, individual and group behaviour. Statistical methods to analysed data are the statistical evaluation of group differences such as before and after training, measures of relationship or correlation between sets of data and graphic methods for displaying differences.

Horgarth (1979) analysed his experiment by evaluating performance by following criteria.
i) Reaction effects - reaction of the participants to a programmes
ii) Learning effect - actual learning of the participants
iii) Job behaviour effects - the communication skill and its effects within organisation
iv) Ultimate value effect - translating benefit of course for the organisation (profit before and after training)

Mathur et al., (1982) stated that a conference of trainees recommended that evaluation of training should be undertaken in systematic manner.

Venkataramu (1984) evaluated Indian Telephone Industries training on two kinds of evaluation norms as soft criteria and hard criteria. Both criteria evaluation is based on the opinion expressed by participants themselves. Hard criteria evaluation includes opinion changes in work behaviour are assessed through the feedback received from the participant colleague, boss and subordinates. It involves strenuous efforts as it enables one to know more precisely the actual impact of training in the context of one's role behaviour and benefit the organisation has gained out of training programmes.

Virmani and Seth (1985) stated that the problems in evaluation of management trainees are i) Lack of goal congruence, the problems further discussed are based on the purpose of evaluation and trainer's approach to evaluation. ii) Problems arising from the variability of management task. iii) A problem arising from the quantitative approach is evaluation.

Krikpatrick (1987) defined evaluation as the determination of the effectiveness of training programmes. Evaluation changes from a complicated elusive generality into clear and achievable goals if we break it down into logical steps as:

i) Reaction – How well the trainees like particular training programmes?
ii) Learning - Evaluation learning is defined as attitudes that were changes the knowledge and skill that were learned.

Further, he stated guidelines as each trainee should be evaluated, before and after approach should be used, control group should be compared with experimental group, and results should be analysed statistically in terms of correlation or level of confidence

iii) Behaviour – What changes in job behaviour resulted from the programmes?
iv) What are the tangible results of the programmes in terms of reduced cost, improved quality and quantity etc.?

Rabbs et al., (1987) described that evaluation is a systematic process of collecting information for and about a training activity which can there be used for guiding, decision making and for assessing the relevance and effectiveness of various training components. It is also used to determine the immediate impact of the activity.

He further, mentioned that food and agriculture organisation (FAO) of the United Nations, Rome, under the guidance and sponsorship of Agriculture Education and Extension Service, Human Resources Institutions and Agriculture Reforms Division, prepared under contract between (FAO) and Agriculture Education Division and International programmes for agricultural Knowledge systems (INTERPAKS) at the university of Illinois at Urban-Champaign.

Rossi and Freeman (1989) stated that there are three major classes of evaluation
i) analysis related to conceptualisation and design of interventions ii) monitoring of programme implementation iii) assessment as impact and efficiency. A comprehensive evaluation may include all of them.

Misra (1990) described two topologies of training evaluation; one is based on levels of training evaluation while other is based on stages of training process.

According to levels of training evaluation: -

i) Reaction level - The Reaction evaluation
ii) Learning level - The learning evaluation
iii) Job behaviour level - The performance evaluation
iv) The impact level - The impact evaluation

According to stages of training process: -

i) Evaluation for planning
ii) Process evaluation
iii) Terminal evaluation
iv) Impact evaluation

Misra (1990) mentioned six models of training programmes as: -

i) Objectives oriented training evaluation - change in KSAOs
ii) Decision - oriented training evaluation-content, input, process and product CIPP evaluation.

iii) Transactional training evaluation - developed by an American evaluator Robert Stake (1967)

iv) Goal free training evaluation-developed by an Australian Michael Seriven (1967)

v) Adversary training evaluation

vi) Illuminative training evaluation - developed by Massachusetts, institute of technology in 1969.

Misra (1990) Catagorised Training monitoring and Evaluation (TME) into four sub phases as,

i) Training reporting

ii) Training monitoring

iii) Training evaluation

iv) Training review

He further stated that there are three main domains of concern with training monitoring.

The domain of top management: - The top management is concerned with training monitoring in knowing i) whether the candidate slotted for training have attended or not? ii) Cost of training to extension organisation. iii) Results of training.

The domain of Trainer: - It may be training organiser or training institution concern with knowing i) required arrangement of training have been made or not? ii) how are they working out in practice? and iii) the results of training.

The domain of trainee - Results of training in view of trainees

He described that training performance has three dimensions namely, i) Participation and commitments of training ii) Utility of training for trainees and iii) Effectiveness of training to extension organisation.

This concept was successfully introduced in national workshop on planning of Agricultural Extension Training on 23-25 January 1989, on the basis of the participation in training course the effect were classified into six categories as training performance indicators

i) Excellent – 75 percent or more

ii) Very good – Above 60 percent but less than 75 percent

iii) Good – Above 50 percent but less than 60 percent
iv) Average – Above 40 percent but less than 50 percent
v) Unsatisfactory – Above 20 percent but less than 40 percent
vi) Very unsatisfactory – Below 20 percent.

Cleland (1994) stated that standardised training evaluation instruments are not specific enough to really assess objective driven training. He mentioned that steps are involved in objective oriented procedural models of training evaluation.

i) Assess training needs.
ii) Develop short and long term objectives
iii) Conduct observations/measurements to determine pre-course evaluation, both short and long term
iv) Summarised record and file for future reference and analysis.

Short term analysis deals with participant’s reaction to the course.

i) How well the course was presented?
ii) How well it was arranged logistically?
iii) How well the instructor presented the material and conducted the class?

2.2.1 APPROACH TO TRAINING EVALUATION

Kirkpatrick (1975) described that evaluation approach to management is improvement over the Hill, Haynes and Baumgartal study, as he extends and elaborate the evaluation process from mere reaction assessment to four stages viz., reaction, learning, behaviour, and result of training. In spite of his approach to assessment at various stages it precludes training variable and organisation variable which could have a definite impact on the overall assessment of training and development.

Miller (1986) considered that the process approach of training is highly interrelated and interdependent on what is total process. This conception of training leads to increasingly more general and less precise training efforts.

York (1989) mentioned that System Approach to the Training originated in 1950’s in the U.S.A. linked with contemporary trend towards more effective management.

The term system approach is derived from an engineering concept, it describes a series of linked and incorporated into the total system in order to achieve corporate effectiveness. SAT consist of number of system, which are interdependent
to the extent that malfunctioning of one system seriously impair the functioning of total system.

The systems are logically developed in accordance with the training policy. Total system linked to national agriculture productivity and production.

Misra (1990) pointed out that there are three approaches for training extension personnel.

i) The Discrete Phase Approach:
Traditional model consists five discrete phases as assessment, objective setting, programmes design, programmes implementation, monitoring and evaluation.

ii) The Process Approach:
Interdependent and interrelated process, a) Need assessment process b) Objectives setting process c) Design process d) Implementation process e) Evaluation process

iii) The System Approach - Consists of five phases as ,
Total system linked to national agriculture productivity and production.

2.2.2 CONSTRAINT IN TRAINING

The multifaceted constraint characterised by situational, informational psychological, technical and other types are highlighted by the review of past literature.


2.2.2.1 Managerial content. i) Many developing countries lack adequate educational systems, ii) Public personnel system and policies are inadequate. iii) There is absence of National training policies. iv) There are insufficient efforts in human resource plan. v) Insufficient salaries and low compensation make it difficult to attract quality managers vi) There is managerial brain drain from public sector vii) The administrative culture of government lacks incentives for self development of first line and middle line managers.

2.2.2.2 Training content. i) there is often a lack of political and administrative support in the larger environment for training and development. ii)
There is a problem in design management and leadership of training institution. Lack of close working relationship provides irrelevant training activities. iii) Incompatible organisational structures do not support, reinforce or absorb new skill and capabilities.

2.2.2.3 General training content. i) Training is for theoretical and abstract frequently with little operational value. ii) The training is too often dominated by imported curricula. iii) The training is not tied to requisite skill of effective public management and indigenous management knowledge.

2.2.2.4 Training Process Content. i) Training is too frequently considered as the importing of an expert’s skills and knowledge in-groups of individuals, thus failure to distinguish between teaching and learning. ii) The training design and method do not always generate participant’s interest and enthusiasm. iii) The limited use of multiple training methods used in developing countries. iv) Comprehensive evaluations of training are seldom included in design of training. v) Training is not adequately integrated with research and consulting activities.

International Seminar Rural on Extension Polices (ISREP), Wageningen, Netherlands (1990) concluded that to strengthen system of rural extension training should be on first priority. It requires more funding arrangements. There should be an increase in national and regional training centres. These include methods for extension analysis and diagnosis, strategies and methods for reaching formwomen, and agriculture, and the environmental.

Sah (1991) mentioned that training effectiveness is due to variety of reasons. i) Trainer – several criticism have been directed against the trainer in respect of their knowledge, lack of commitment, lack of communication, inconsistency in trainers of different backgrounds.

ii) The training programmes – Unscientific organisation of training programmes lacks the job situation, orientation, frustrating effect, difficult task to change attitude, haphazard lesson plan and techniques and organisational facilities, arbitrary selection of officers, lack of organisational collaboration.

iii) The nature and psychology of participants – Negative attitude, lack of initiative and responsibility passivity of trainees.

Training evaluation is an attempt to obtain effect of training and to assess the value of training in light of that formation for improving further training.
programmes. Most of the researchers have made maximum use of one tool of evaluation i.e. the perceptions and reported reaction of participant. The level of training evaluation provides more precise and sound results. The training monitoring indicators are convenient tools for training monitoring for the domain of top management, trainer and trainees. The system approaches to training provides valuable and national means to plants, design and retain the training accomplish to effective behaviour modification of learner.

2.3 Oyster Mushroom

While screening the literature regarding mushroom, ample references on the mushroom biology were available. Some of the relevant references were collected on the topic as local names of oyster mushrooms, Substrate availability, advantages of mushroom cultivation and nutritive and medicinal values of mushrooms and exhibited as follows;

Zadrazil and Schneidereit (1972) revealed that the spread of mycelium growth of *Pleurotus* is greatly dependent on temperature and humidity. A temperature range of 20-26°C. (24 ±1°C.) and relative humidity of 70-90 percent is ideal for *pleurotus* sajor-caju.

Zadrazil and Dube (1992) reported that *pleurotus* genera show much diversity in their adaptation to varying agro-climatic conditions and give more cultivated species than any other mushrooms.

Balkrishna and Nair (1995) observed that *pleurotus* spp. suited to different climatic zones namely temperate, tropic and sub tropic and have prosperous future as Self-employment Avenue for the rural sector.

He further stated that the oyster mushrooms are also called as ‘dhingri’ or ‘alone’. These groups of mushroom have the tongue shaped pileus with an eccentric lateral stipe.

Lal and Sharma (1995) mentioned that mushrooms, a form of fleshy edible containing about 90 percent moisture, they are rich source of proteins having essential amino acids in good proportion and minerals as well as vitamins.

(Lal) reported some local names of the mushrooms as ‘almbi’, ‘umbrella ‘Kukurmutta’ etc.
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Lal and Sharma (1995) mentioned that mushrooms, a form of fleshy edible containing about 90 percent moisture, they are rich source of proteins having essential amino acids in good proportion and minerals as well as vitamins.

Vsatkar (1998) reported some local names of the mushrooms as ‘almbi’, 'dogkhumb', Dog's umbrella 'Kukurmutta' etc.
2.3.1 SUBSTRATE AVAILABILITY

Mushroom has ability to degrade ligno-cellulosic materials. Hence agricultural wastes is the best substrate for mushroom cultivation. Large quantities of variety of agro-wastes are available in our country, which are successfully tested for the production of oyster mushroom.

Ghose et al. (1978) mentioned that in India the total quantity of agricultural by-products of waste which are cellulosic in nature account for nearly 25 million tones per year. These materials assume perennial source of raw material for mushroom cultivation.

Chadha and Sharma (1995) reported that more than 300 millions tones of agricultural wastes is available annually in India and about half of this residue remains unused. Some quantity is allowed to decompose in field which helps in the perpetuation of several pests and pathogens, and appreciable quantity is burnt in the field which adds to the environmental pollution. These residue are resistant to degradation because they contain mainly cellulose and lignin (80% of total dry weight at straw). In the process of mushrooms cultivation these agricultural by-products results in a high valued food protein suitable for direct consumption, and wastes can used as animal feed stock. He further stated the transfer of technology to the extension workers and conducting at training programmes as one of the thrust area during VIII five-year plan.

Jadhav and Patil (1995) stated that the major food crops of Maharashtra are Paddy, wheat, jawar, and bajara while cotton, banana, sugarcane, vegetables and pulses are major cash crops. Therefore abundant waste plant material is available in this region.

Chattopadhyay (1998) reported that use of three varieties of wild grasses as substrate by replacing conventional paddy straw to the extent of 50 percent. Thus scientific outcome has caused reduction of cost of cultivation by 15 percent.

A wide variety of substrate have been successfully tested for the cultivation of oyster mushrooms, important among them are straw of cereals and millets, hulled maize cobs. Cotton wastes and banana pseudo-stem (Jandaik 1974, Bano et al., 1987, Sivaparakasan et al., 1979). However, presently the list has been further enlarged with Jawar straw, groundnut pod (Khandar et al., 1991) rubber wood wastes and saw dust (Mathew et al.1991), fodder grasses and other crop residues (Verma et
2.3.2 ADVANTAGES OF MUSHROOM CULTIVATION

Cultivation of mushroom has varied advantages; some of the studies of mushroom cultivation were collected and presented under this subheading.

Bisaria and Meera Madan (1983) stated that mushroom cultivation has gained popularity in India. The varied climatic conditions in different parts of the country help in growing mushroom without artificial temperature and humidity control. A lot of bio-waste is being generated in rural areas and this waste could be utilized directly through mushroom cultivation converting them to protein rich palatable food.

Bisaria et al. (1983) have reported that the increased nitrogen susceptibility and increased nitrogen content of the spent residue’s as a result of mushroom growth seems to be the likely factors for enhanced production of bio-gas. Residual solids from the digester are good sources of organic fertilizer.

Jandaik (1993) described that in India the cellulosic waste amount to be 26 million tones, which increases pressure on environmental pollution and creates health hazards besides having its disposal problems. In this context pleurotus species represented one of the major economical profitable, biotechnology process of conversion of waste plant residues into protein food which will help in overcoming protein malnutrition problem in developing countries like India.

Rai (1993) noted that widespread malnutrition with even increasing protein gap in developing Countries has necessitated the search for alternative source of protein. Because of production of pulses, the traditional source of protein, India has not kept pace with population growth. Mushrooms with their flavour, texture, nutritive value, very high productivity per unit area and time less dependence of land and ability to grow on a variety of residual agricultural waste have rightly been identified as a food source to fight malnutrition in developing countries.

Sharma (1993) mentioned that India is a sub-continent with an area of over three million sq. km. Most of its population (about 80%) is dependent on agriculture and lives in village.

Removal of poverty in rural areas is one of the priorities before the planner’s. For present population, we need 225 metric tones (i.e. 225 kg. Per capita per year) of...
food grains against the present production of 150 M. tones. Indian diet is primarily cereal based, quite rich in calories but highly deficient in proteins. Ill effects of chronic malnutrition are common in low-income groups. The country at present has almost the lowest per capita consumption of protein in comparison to developed countries. The problem would become acute with rise in population. To meet the growing food needs of the country, diversification of the present day cropping patterns is essential to provide the quality food for the people.

Mira Madan (1994) reported that advantages of mushroom cultivation are as any thing, which does not demand too much land, costly seeds, fertilizers and irrigation. Inputs should be the choicest approach in the village, less time consumption, no drudgery in-door or nearby space availability are the advantages of mushroom cultivation. Hence pursuance of this vocation increase the family income and food problems in our country.

Mira Madan et al., (1994) stated that spent substrate can be utilised in following ways.

i) As an energy source used in biogas plants methane production for direct burning.
ii) As soil fertilizers or conditioner.
iii) On partially burned to make charcoal.
iv) As animal feed.

Asha Mane et al.,(1995) stated that cost of 46.20 gm of protein is estimated from 100 gm. Dried mushroom was Rs. 8. This cost of protein is lower than vegetable protein and meat protein. It is concluded that mushroom is a rich and cheaper source of protein.

Savithri et al., (1996) revealed that women and unemployed youth can supplement their income by spending little money and with proper training in mushroom cultivation.

// 2.3.3 NUTRITIVE AND MEDICINAL VALUE

Mushroom has tremendous medicinal and nutritive value. Some of the related references are presented in the following lines.
Kaul (1978) revealed that mushroom as diet plays an important role in rural and urban areas. Women can actively involve in oyster mushroom cultivation and can be integral part of any development programme.

Tam et al., (1986) revealed that *pleurotus sajor-caju* had hypotensive, reduce rate of nephron deterioration that may extent life span of chronic renal failure patient.

Bisaria (1987) stated that digestibility of mushroom protein is high. Mushroom contains the following nutrients on dry weight basis, water -90%, protein -3.7%, fat -0.40%, carbohydrates -4 to 5%, fiber -15%, and calories 30 per 100 grams of mushroom. The mineral content in *pleurotus sajor-caju* cultivated on paddy straw was analysed as: Ca -40,P-565, K-2240, Na-256, Mg-156, Fe-12.8, Mn-4.2, Zn-2.6 and Cu-0.54 mg per 100 grams of fruit bodies.

Khanna et al., (1993) carried out studies on rates and confirmed that inclusion of dried dhingri at 5% or 10% level in diet of hyper cholesterolemic rates resulted in higher food intake without any effect on gain in body weight. Lipid, cholesterol and glyceride on levels in plasma were significantly decreased on feeding dried *pleurotus* in diet.

Nanba (1993) observed significant antitumor activity in oyster mushrooms.

Rai(1997) stated that mushrooms are a good source of quality protein and are rich in vitamins B-complex including folic acid and B-12. As low calorie, high protein item with negligible starch and sugars are delight of the diabetic. A very high potassium: sodium ratio, low calorie and fat make mushroom the choice of the dietician for obesity, hypertension. Alkaline nature and high fibre contents are needed for hyperacidity and constipation is present in mushrooms.

Chattopadhya (1998) reported that the edible fungi contain 26-42 percent protein within excellent composition of amino acids, minerals and vitamins.

Manekar et al., (1999) stated that mushrooms are manifestation of the idea in constituting both a nutritionally functional food and source of physiologically beneficial medicines. The recent application of modern analytical techniques has in a number of cases, provided a scientific basis for these earlier empirical observations. More than 80 hepaprotective triterpenoids and over 50 carcinostatic polysaccharides have been isolated from basidiocarps and mycelia of *Ganoderma lucidium* and related species *Ganoderma tsuage*. In addition mushroom contains...
other substance, which reduce blood pressure and blood sugar levels, eliminate cholesterol and inhibit platelet aggregation.

Oyster Mushrooms are fleshy edible fungi, this group of Mushrooms has tongue shaped pileus with an eccentric lateral stipe and included in *Pleurotus* genera. This genus shows much diversity in their adaptation to varying agro-climatic conditions. Plenty of plant waste material is available in Maharashtra, which can recycle in the process of Mushroom cultivation as nutritious food for human being and feed for animals. Thus it helps to control soil and air pollution in some extent. Simple technology, little investment, limited space, congenial climatic conditions, and somewhat skill and care are the requirements of oyster mushrooms cultivation. Hence ideally suited, as excellent leisure time activity therefore need for popularising the technology amongst community is observed.

### 2.4 Mushroom training

The experiences of the past researches on training facilitate to understand the method and effect of training. Mushroom cultivation training is new research area hence a very few research evidences are available which are presented as follows.

Kumar (1993) described that village women now adapted mushroom cultivation as a source of self-employment. District Rural Development Agency, Raipur, has organised 45 days training of mushroom cultivation. Sixteen women were became as master trainer and they trained as many as 20 women. In this way nearly 280 women were trained from October 1992 to March 1993. They have cultivated and produced ten thousand-Kg. of mushroom. Further he suggests that to popularise mushroom in city and villages, functions have been organised as mushroom picnic, mushroom rally, mushroom lunch for hoteliers motivation camps.

Rao (1993) pointed out that mushroom cultivation is a kind of cultivation ideally suited for housewives, unemployed youth and land-less farmers. As mushroom cultivation is gaining popularity in India, training institutions and mushroom cultivation centres are springing up at phenomenal pace.

Savithri et al., (1993) pointed out that a quarter to one third of rural areas of the rural population in the country is estimated to subsist in poverty. In general two reasons could be attributed to this seamy side of our development scenario. Firstly,
the poor did not have access to resources to translate technology into production and income, secondly the focus on the potential of physical resources and much less of human resources. Hence M.S. Swaminathan Research Foundation seeks to evolve a rural development approach by the technological empowerment of the resources. The baseline survey was conducted to know economic viability, environmental compatibility, social equitability and socio-economic conditions of the people. The project was launched in November 1992. The methodology of implementing the project consisting of testing and adoption of technology, market survey, marketing support, establishment of spawn production unit, training of participants and setting up mushroom units. Participants of this project were land-less women. In order to know the time devoted by participants in mushroom production taken as an income generating activity.

It was further stated that the basic principle underlying the economic enterprises proposed in the project is decentralised production and centralised marketing. To meet the spawn requirement the project has set up small but well equipped spawn production centre. A three-day incentive training programmes was arranged prior to training at the Tamil Nadu Agricultural University, Coimbore. Participant's active involvement inculcates confidence to take this activity on a sustainable basis. The average per day production of fresh oyster mushroom from an individual Unit is around 350 grams; monthly net income of Rs.100-150 can be earned. Thus mushroom cultivation was considered as potential enterprise for landless, illiterate rural women.

Chadha (1994) mentioned that the Indian Council of Agricultural Research (ICAR) sanctioned the creation of National centre for mushroom Research and Training (NCMRT), during VI plan on October 23,1982. The objectives were conducting research on problems of mushroom production, preservation and utilisation, to impart training to scientist, teachers, extension workers and growers.

Kumar et al. (1994) stated that growing of oyster mushroom is an ideal income generating activity for the landless women and unemployed rural youths. He further studied that climatic condition, soil, topology, vegetation of the Sikkim and determined feasibility of the study, conducted 10 days training in button mushroom and oyster mushroom cultivation. The training was organised by Institute of Home
Economics and suggested that empowerment and institutionalisation must be built into on-going implementation activity.

He also reported that agriculture research system of the third world countries working in support of agriculture developments. And is expected to produce technologies useful for a wide range of clients, extension service development agencies, state crop farmers, large and middle scale commercial farmers and small scale resources poor farm households. It is in meeting the needs of resource poor farm households representing a major share of the world's poorest and most vulnerable people that agriculture research has faced the greatest challenge. Mushroom cultivation is also significant in enhancing household income of resource poor rural families. Therefore it is important that small-scale farmers are provided with appropriate technology by organising mushroom training courses. There is a vast scope to popularise mushroom production. However, quality is the first requirement both for domestic and foreign markets. There is a need to make full use of the developments and research grants being provided through department of Horticulture in different states. ICAR, Horticulture Universities, and National Centre for Mushroom Research and Training, should help the growers in different aspects of mushroom cultivation.

Meera Pimpalaskar et al., (1994) described that cultivation of oyster mushroom has been identified by BAIF, as a low cost biotechnology having considerable scope as an income generating activity for tribals and rural poor especially the women. Due to several advantages of mushroom cultivation such as, nutritional value, taste and low production cost, it has been accepted by the rural people. A standardised technology package was developed and introduced in the project area, using paddy straw as locally available substrate. Four groups consisting of total sixteen participants were given spawn and training for cultivation of mushroom under BAIF'S supervision. They obtained 83.5kg yield and earned Rs.2926/- as a net income in a period of 35 days. The biological efficiency was found to be 15% on dry weight basis. This illustrates that oyster mushroom cultivation could very well supplement the income of rural household, thus a useful alternative vocation in rural development.

Jadhao et al., (1995) stated that cultivation of mushroom being a non-traditional activity & beginners in this enterprise need training cum guidance.
Training facilities are made available by AICMIP Pune centre. Every Thursday demonstration-cum orientation programmes in mushroom cultivation being organised. About 25-30 participants get the advantage of this programme every week.

Satya sundaram (1995) reported that the diversification of the farm sector is the key to agricultural prosperity. The healthy growth of agro-based industries is indispensable for fully utilising the agricultural wastes. Mushrooms can be grown on commercial lines, oyster mushroom cultivation can bring a return of two hundred percent in just 45 days. The technology has been simplified so that even lay people can take to mushroom cultivation. Further he suggests promotional measure to increase mushroom production as 1) search for export avenues for dry mushroom and mushroom powder. 2) Continual research programmes to update technologies. 3) Setting up of grower co-operatives and 4) Availability of finance on liberal terms to growers.

Khare (1996) reported that women as well as unemployed youth could supplement their income by spending little money and with proper training.

Balkrishnan et al., (1997) revealed that oyster mushroom requires more and more attention of researchers so as to bring the technologies too handy to layman and bring the production, marketing and consumption.

Nita Bahl (1997) reported that Indian Agricultural Research Institute started training programme of “Mushroom cultivation” since 1972. Lectures and demonstration are given and a field trip is also organised to help trainees to know practical problems of growers.

She further stated that National council of Education and Research Training (NCERT) has already worked out programme on mushroom cultivation to be introduced in high school level.

Kumar et al., (1997) mentioned that the need of the hour is to evolve a rural development approach by technological empowerment for the upliftment of women. Growing oyster mushroom is an ideal income generating activity of landless women and rural youth. Availability of cheap raw material, low initial investment, simple technology, and limited space requirement make it worth while preposition. He further stated that mushroom cultivation is a process that improves quality of life and economic status of the trainees.
This would enable to sow early seeds of awareness in this important aspect. Mushroom farming and development will certainly lead towards the improvement of Indian economy in terms of export of mushroom.

Chattopadhyya (1998) stated that mushroom farming is very important both in respect of employment generation and as a source for rich protein food in rural areas. The rural development centres has also done considerable work for the development of cultivation technology of different species edible mushroom suitable for the agro-climatic condition of south Bengal.

2.5 Constraints in Mushroom Training

Tewari et al., (1988) found that absence of regulated marketing channel, mushroom often being consumed by the elite section of the society could not find a place in food basket of middle and lower class people; were the main constraints of the mushroom growers.

Kohli (1990) reported that the cultivation of mushroom in Himachal Pradesh has been in operation for the last two decades and a large number of training camps have been organised since then, yet very few farmers had really adopted its cultivation as a profession.

Suharban (1991) reported that majority of respondents felt constraint in marketing of the mushrooms. This was followed by difficulty experienced in the production of spawn and lack of financial assistance for mushroom growing. It was also observed that difficulty in production of spawn and difficult cultivation practices are some of the main constraints faced by the farmers.

Chang and Miles (1993) mentioned that cultivation of mushroom particularly tropical mushrooms, in tropical and subtropical countries is still primitive. Several reasons which may be directly or indirectly related to the slow development of mushroom cultivation is tropical regions will be presented as, social concept, as price is high assumed as food for luxury, lack of interest of academicians or research in mushroom biology and for training of personnel to work. Shortage of technical expertise, lack of regional conferences and co-operative activities, lack of regulated marketing practices.
Jadhao et al., (1995) reported technological assistance and marketing of oyster mushroom and non availability of quality spawn are the major constraints. These problems can be overcome by forming mushroom grower co-operatives.

Khurana (1995) observed that non-availability of spawn, lack of regular marketing facilities, lack of practical oriented training, misconceptions among the minds of people about poisonous mushrooms are the main constraints of mushroom training, cultivation, production and for acceptance as elite food.

2.6 Mushroom Cookery

Mushroom popularisation can only be achieved by putting it in the menu of local community through various proportions. Hence studies on recipes of Indian blend were reviewed and presented as follows

Singh et al., (1977) has studies the suitability of oyster mushrooms for Pickle. The main principle here is that storage life is extended after partial removal of water from fresh mushrooms followed by addition of species salt with seasoning. Addition of vinegar increases test and protection from microbial attack.

Zakia bano (1988) reported that a very agreeable sweet-chutney was prepared from pleurotus mushrooms.

Philomena (1989) confirmed that edible mushrooms are a wonderful gift of nature. Mushroom cultivation began in the early 17th century in France. By 1850 French horticulturist made it thriving industry in Paris. Now mushrooms can be easily cultivated and be sure of setting up a profitable industry.

Oyster mushroom grown on a wide variety of agricultural wastes, which are easily available and inexpensive. The cost of production ranges from Rs. 5-10 per kg. Further, he stated that mushrooms could be cooked in a variety of ways: soup, sauce, fried etc. Oyster mushroom also can be cooked with other vegetables, pickles, pakodas, noodles, macaroni, egg, peas, cauliflower, potato and tomato.

Thakur (1993) opined that mushrooms are highly nutritious, easy to cook and with excellent culinary qualities, besides valued for aroma. Being a recently introduced vegetable in the Indian menu, there is need to adopt and cook mushrooms more for Indian taste. Mushrooms can be cooked in variety of ways like sandwich,
omelette, soup, salad, vegetable stuffing, curries, in combination with other vegetables or mutton, rice, pulao, pickles etc.

Zakia bano et al., (1994) suggested that the methods of preserving mushrooms are refrigeration, deep freezing, canning, dehydration and pickling. CFTRI has recently introduced a cost-effective, space saving, high yielding simple technology for the industrial production and processing of oyster mushrooms.

Ghosh et al., (1995) reported that cheese whey was utilized for the development of a whey based mushroom soup which was prepared with 4 percent mushroom, 2-5 percent corn flower and 90 percent whey have found to be most acceptable. The total solids, fat, protein and viscosity values for the acceptable concoction were 13-01, 2.65 and 56 percent respectively.

Lal and Sharma (1995) reported that short term preservation methods of mushroom are pre-packing coupled with low temperature storage, irradiation, steeping help to prolong storage life. While long term methods like canning and pickling can make the availability of good quality mushroom through out the year at reasonable cost. He further stated that mushrooms could successfully utilised in the weaning foods, biscuits, and soup powder and in number of dishes in the kitchen.

Kanchan Pawar (1995) studied sensory quality of sandwiches prepared from fresh as well as dry mushroom. She found that the sandwiches are highly acceptable and did not show significant difference in the sensory characteristic of fresh and dry mushroom as well.

Ghanekar (1996) suggested some mushroom recipes as mushroom soup, clear soup, mushroom chicken soup, mushroom mutton soup, mushroom and vegetable clear soup, mushroom toast sandwich, mushroom chapati role, mushroom stake, mushroom pakoda, mushroom masala, mushroom pickle, and mushroom kheema, These recipes will be accepted as based on Indian taste.

Sunita Mahalle (1996) stated that substitution of 10% dry mushroom powder in weaning foods was highly preferred.

Chattopadhyay (1998) observed that significant value addition has been made possible by introducing technology for processing mushroom for production of jam, jelly, pickles, sauce, and as dry mushroom technology is involved in this regards are conversion to food item preservation, bottle for capturing urban market.
In spite of multifarious advantages of OMC quite few efforts were observed in this direction. Noteworthy observation was that, only some institutes and agencies are working for enhancing OMC. The various studies reported constraints as non-availability of quality spawn, lack of support from government and industries, lack of co-operative activities and regulated marketing practices.

2.7 Dependent Variables

The review of past researches connected with relation between dependent and independent variables has been presented in this section. There were a few research evidences available on this aspect.

✓ Knowledge

The effect of training was conceptualised as change in knowledge, skill and attitudes. Knowledge is the unique resource for value creation and maintenance. Hence knowledge was the indicator of deciding worth of the training, therefore studies on the knowledge was screened. Some of the relevant studies were collected and presented as follows.

Bloom (1956) defined knowledge as these behaviours and test situations that emphasized that remembering either by recognition or recall of ideas, material or phenomenon.

English and English (1958) stated that knowledge as a body of understood information possessed by an individual or by a culture. They further explained that knowledge is that part of a person’s information, which is in accordance with established facts.

Reddy (1966) mentioned that knowledge is one of the important components of the covert to overt behaviour of an individual. Hence it was considered that the extent of knowledge possessed by rural women might produce changes in their role behaviour.

Rogers and Shoemaker (1971) mentioned that knowledge as a function or stage in the innovation decision process. This exemplified the importance of knowledge in decision and adoption process.

Kurb and prokopenko (1989) defined as knowledge is a retained information, concerning facts, concepts and relationships.
Skill

World Bank Guidelines (1983) defines skill as the ability in using one’s knowledge effectively and rapidly in execution of performance.

According to Kurb and Prokopenko (1989) skill is an ability to do things, to effective apply knowledge and personal aptitudes and attitudes in work situations.

A concise psychological Dictionary defined skill as, an action formed by repetition and characterised by a high degree of performance and performed more or less automatically.

Attitude

Allport (1935) has defined an attitude as a mental or neural state of readiness organised through experience exerting a directive or dynamic influence on the individual response with related object.

Bogardus (1942) defined an attitude as a tendency to act towards or against environmental factors, which become there by a positive or negative value.

Skinner (1952) mentioned that attitude as an idea with emotional content, important beliefs, prejudices, bias, predisposition, appreciation, and state of readiness.

According to Thurstone (1966) an attitude is a degree of positive and negative effects associated with some psychological objects.

Peterwarr (1970) defined an attitude in terms of a set of opinions. Each “opinion” may be measured by a rating scale, and the overall pattern of a person’s scale responses make up his “attitude” so far as training evaluation is concerned. The opinion scales have to be selected to cover the main aims of the training programme.

2.8 Relation Between Independent Variables and dependent Variables

The effect of training was conceptualised as change in knowledge, skill and attitudes. Knowledge is the unique resource for value creation and maintenance. Hence knowledge was the indicator of deciding worth of the training, therefore studies on the knowledge was screened. Some of the relevant studies were collected and presented as follows.
Lukas (1974) reported that the participation process could inspire favourable attitude among the members due to the following reasons.

1) The participation process is challenging ii) Participation usually foster more commitment to change iii) Participants in the process become more knowledgeable about change itself, and develop more skills and opportunities to control it.

Bhalekar (1981) found that there was no significant association between age and adoption farm practices.

Manchanda and Hansra (1983) revealed that age was negatively and significantly correlated with gain in knowledge. He also stated that there is no significant difference found in social participation and gain in knowledge.

Mingat (1984) revealed that effects of project related training were greater in countries with a high general level of literacy and training had little effect when literacy rate was less than 40%. This finding underscores the importance of investment in literacy for human resource development.

Kamble and Shinde (1988) stated that availability of various sources of information were significantly related with adoption.

Singh and Patel (1988) found that social participation develops a wider outlook leading to higher contacts with outside world.

Anantharaman and Ramanathan (1990) reported that about 90 per cent of trainees were satisfied with the training programmes.

Reingold (1990) described that the focus in learning is the subject while in teaching the focus is on the person.

Nagpal and Yadav (1991) revealed that age, education, material possession and social participation were significantly associated with knowledge of energy conservation. Age, family size, material possession, social participation and mass media contacts were found to significantly associated with attitudes, while social participation was significantly associated with symbolic with symbolic adoption of energy conservation.

According to Garvin (1993) a learning organisation skilled at creating, acquiring and transferring knowledge and insight. Further mentioned that there is performance improvement for knowledge enhancement
Verma et al. (1993) reported that overall training impact shows that rural women have potential for knowledge acquisition and attitudinal change which was reported to the extent of 44.03 to 55.41 per cent, follow-up action is essential to sustain the learnt behaviour.

Wasnink (1993) reported that significant positive relation between socio-economic status and adoption behaviour.

Anil Kumar et al. (1994) found 29.30 percent increase in knowledge on improved farm technology due to training.

Lal and Panwar (1994) found significant positive correlation between training utility, training satisfaction, training duration and gain in knowledge of trainees. The relationship between age, existing knowledge, and gain in knowledge was negatively significant.

Mahipal and Prasad (1995) mentioned that majority of the trainees have gained satisfactory knowledge in various training programmes.

The teaching methods, coverage, their utility and effectiveness have resulted in higher job satisfaction of the participants.

Age and education of trainees was found non-significantly associated with job satisfaction.

Mohod et al., (1995) reported that education of trainees was positively and significantly correlated with training effectiveness. Land holdings and annual income of trainees were found not significant.

Khorde and Nibalkar (1996) mentioned that level of adoption had positively significant relationship with education, annual income, socio-economic status, social participation and source of information.

Mahipal and Prasad (1997) reported that 80.50 percent respondent have gained medium level of knowledge about various technologies imparted during training, 7.03 percent respondent had gained his knowledge, it means that the training programme have included the course content well suited to the trainees job needs. The training methods used might have created interest to learn. These findings are in accordance with the Mahipal and Prasad (1995). In which they have stated that the training satisfaction includes the technical competence of the faculty, relevance of reading material provided, training and communication facilities
available during training programme. 70.80 percent participants were in the medium level of satisfaction followed by 19.5 percent with high level of training satisfaction.

Kumar and Vinita Brindra Ban (1997) conducted a week-long training programme on oyster mushroom cultivation for slum dwellers. Twenty-five participants had attended training. In spite of poor education and social pressure, the trainees absorbed the process of cultivation and post harvest processes very well and acquired knowledge. 50 percent trainees adopted the cultivation technology and tried cultivation at their own places.

Neelam et al., (1998) studied training needs of 60 women farmers from Hissar district. She observed that 50 percent women were interested in areas like mushroom cultivation, bee keeping etc. It was found that farmwomen have lack of knowledge and skill about improved technology and they are interested to get it.

Sanyogita Deshmukh et al., (1998) reported that 56 percent of the respondent had adequate knowledge regarding mushroom but not a single respondent was knowledgeable about cultivated mushrooms. The age and knowledge was significant variables where as there was insignificant relationship between education and knowledge regarding edible mushrooms. It was observed that there was significant relation ship of occupation and income with knowledge regarding mushrooms.

Most of the respondent reported that elder family members were the source of knowledge followed by television and printed media.

Tomar and Gaur (1998) stated that the changes in behaviour took place through training in the form of creating confidence, interest and developing knowledge of modern agricultural technology. Deshpande (1989) observed the similar finding.

Rao (1999) reported mushroom cultivation is very simple process; it requires care, skill, patience and constant monitoring.

Tripathi and Kaushik (1999) studied extent of participation of women in mushroom cultivation activities and observed that contribution of women in small units was maximum while in medium size and large farming units contribution of labourer was high. Further suggested that training on technical cultivation of mushroom must be provided these women with help of governmental and non-governmental agencies.