SUMMARY AND CONCLUSIONS
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Today agriculture in India is one of the most prominent sectors in its economy. Women have always played an important role in agricultural activities. Women play an important role in all stages of crop production, starting from land preparation to harvest and post harvest processing. The type and extent participation by farmwomen in farm operation vary from place to place. Today's agriculture needs to be managed more scientifically to increase productivity and production. There is an urgent need to collect a lot of information on the role of farmwomen and particularly those engaged in farm as women farmers. Technological upgradation is necessary for increasing the work efficiency of women in various agricultural activities. This would help the concerned to make suitable changes in their activities to help the farmwomen and women farmers to produce more and make the agriculture more sustainable. So the present study has been taken up with the following objectives.

1. To find out the agricultural practices prevailing in the northern transitional zone Karnataka state

2. To analyse the prevailing agriculture practices with respect to its sustainability based on effective use of resources, technology adoption economically and socially accepted etc.

3. To sensitize women workers for ecofriendly approaches to agricultural practices

4. To identify/study the impact of sustainable agriculture on family economy
Major findings of the study were as follows:

❖ Majority of the women farmers were illiterates in Dharwad (35.56%), Belgaum (28.89%) and Haveri (53.33 %) districts. More than 90.00 percent of the women farmers in Dharwad and Belgaum districts and 87.78 percent of women farmers in Haveri district were married. Majority of the women farmers were agriculturist and they were working in their own land (68.89% in Dharwad, 81.12% in Belgaum and 72.22% in Haveri districts). Husband’s occupation was also agriculture as noticed in 60.00-76.00 percent of the families in all three districts. More than 70.00 percent of the respondent’s husbands were healthy (86.67%, 90.00% and 72.22%) in all three districts. Majority of the nuclear families were found in all the three districts namely Dharwad (82.22%), Belgaum (91.11%) and Haveri districts (76.67%).

❖ Equal percentage (36.62%) of women farmers in the young and middle age groups in Dharwad district. Young (43.48%) women farmers were maximum in Belgaum district. In Haveri district maximum number of women farmers fell in the middle age group (43.16%).

❖ More than half of the families have 5 to 8 family members in all the districts and the percentage ranges from 51.58 to 68.88 percent. Family having up to 5 members was shown next in Dharwad (34.44%), Belgaum (22.24%) and Haveri districts (42.10%).

❖ In Dharwad district more than half of the women farmers have 10 to 20 years of farming experience. In Belgaum and Haveri districts more number of women farmers (47.83%) have 10 to 20 years and >20 years of farming experience (59.34%) respectively.

❖ Less number of women participation (around 9 to 14%) with no role of their husband was observed in almost all agricultural activities. More than half of the husbands partially (52.00 to 56.00%) participated in agricultural activities. Planning of farming
system was the only agricultural activity performed by husband with equal participation of their wife recorded by 46.97 percent.

- Nearly 20.00 percent of the agricultural activity such as helping in marketing and selling was dominated by women only observed in Dharwad district. Equal participation of husband was noticed by 60.00-70.00 percent in all listed agricultural activities in Dharwad district. More than 80.00 percent of the agricultural activities performed by husband with partial participation were observed in Belgaum district. In Haveri district, nearly 22.00 percent of the agricultural activities such as arrangement of farm inputs and financial support were performed by women only. Planning of farming system was agricultural activity performed by equal participation of husband (60.60%) in Haveri district.

- Participation of husband in Dharwad district was recorded with the mean score of 2.42 to 2.62 and in Haveri district it was 2.12 to 2.48. But in Belgaum district all the agricultural activities were performed by partial participation of husband and the score was recorded as 1.88 to 2.05 scores.

- Dharwad recorded the highest participation of husband in agricultural activities and the index mean score was more than 80.00. Followed by Haveri district recorded the index mean score of more than 70.00 in all the activities except planning of farming system activity (index mean score of 82.80). The lowest index mean score of participation of husband in agricultural activities was recorded in Belgaum district (index mean score of 63.00 to 68.00).

- In Dharwad district, more number of families belong to low (46.66%) and medium (44.45%) income groups. More than half of the families belong to medium income group (65.56% and 57.78%) in Belgaum and Haveri districts respectively.
- Maximum number of families (more than 80.00%) had storage facilities of seeds, grains, vegetables and fodder in Belgaum district. In Dharwad district, 75.56 percent of the families had storage facilities for seeds followed by grains (63.33%). In Haveri district more than 60.00 percent of the families had storage facilities of seeds (69.14%) and grains (67.78%).

- Sowing (17.63, 21.44 and 12.19 man day scores in Dharwad, Belgaum and Haveri districts respectively) nursery raising (man day score of 9.75, 16.88 and 9.75 in Dharwad, Belgaum and Haveri districts respectively) and transplanting activities with man day score of 10.25, 13.13 and 7.13 in Dharwad, Belgaum and Haveri districts respectively. And they usually spent 3-7 hours/day for performing the above mentioned activities.

- Inter cultural activity involved weeding, hoeing and cultivating activities among which the weeding activity got highest man day score of 28.69, 30.94 and 23.00 in Dharwad, Belgaum and Haveri districts respectively and the time spent was recorded as 9 hours per day in Dharwad and Belgaum districts and 8 hours per day recorded in Haveri district for performing of weeding activity.

- Manual threshing (man day score of 34.00, 38.81 and 26.25) and sickle harvesting (man day score of 24.38, 29.25 and 22.19) scored maximum man day scores in Dharwad, Belgaum, and Haveri districts respectively. The time spent of 7-9 hours and 5-6 hours in a day by women farmers for performing of manual threshing and sickle harvesting activities in all the districts.

- More than half of the women farmers involved in bed farming activity in Dharwad (65.00%), Belgaum (78.00%) and Haveri (55.00%) districts. More than 80.00 percent of the women farmer involvement was observed in sowing and transplanting activities in Dharwad and Belgaum districts, seed preparation and gap filling
activities in Belgaum districts. In Haveri district, more than half of the sowing and transplanting activities were performed by women farmers except the nursery raising activity (38.00%). Weeding was the only activity performed by more number of women farmers in Dharwad and Belgaum (more than 90.00%) and in Haveri it was noticed as 75.00 percent.

- Dharwad had highest acres (7.48 acres) of gross cultivated area followed by Belgaum (6.64 acres) and Haveri (5.64 acres) districts. The cultivated area also shows the same as in Dharwad (6.53 acres), Belgaum (6.47 acres) and Haveri (5.36 acres) districts.

There was highly significant difference was observed in leased in cultivated area between Dharwad-Haveri and Belgaum-Haveri districts. Highly significant difference was found between Dharwad-Belgaum districts with related to leased out cultivated area.

- More than 5 acres of area was cultivated in black soil in all the districts. More than 4 acres of cultivated area have medium black soil and red soil in Dharwad, Belgaum, and Dharwad, Haveri districts respectively.

- More than 60.00 percent of the soil related problems experienced by women farmers in Dharwad district. In Belgaum district, more than 90.00 percent of the women farmer experienced the water logging and poor drainage problem.

- All the families in Dharwad, Belgaum and Haveri districts had on an average 5.49, 4.86 and 4.8 acres of dry land respectively.

- Well was prime source of irrigation used by 5 families for irrigating 3.28 acres of land in Dharwad district. And 21 families used bore well water for irrigating 2.65 acres of land. Well and bore well used by 4 and 9 families for irrigating 2.83 and 3.06 acres of land respectively in Haveri district.
More (72.59%) number of the women farmers always work with their husband for smooth management of farming activities in the study area. Majority of the families (61.85%) never hired labour for seasonal work in the farming activities. In more number of families (74.82%) the farming activities were always supervised by self or by family or by unpaid members.

In 76.56 and 91.02 percent of the families, women farmer always worked with their husband in the farming activities in Dharwad and Belgaum districts respectively. But in Haveri district the farming activities were done by women farmers with their husband by always (49.95%) and sometimes (37.74%). In Dharwad and Haveri districts 74.45 and 54.45 percent of the families never hired labour for seasonal work in farming activities and in Belgaum district, 56.61 percent of the families sometimes hired labour for seasonal work in farming activities. More than 70.00 percent of the farming activities always supervised by self or by family or by unpaid member in all the selected districts.

All the women farmer worked with their husband in farming activities by sometimes to always and scored 2.38 to 2.86 of mean score in all the selected districts and same was recorded in use of family labour with the mean score of 2.20 to 2.71. Use of implements in Haveri district was noticed by always (mean score of 2.90) and sometimes in Dharwad and Belgaum districts with the mean score of 2.14 and 2.43 respectively.

More number of farm women work with their husband and use of family labour in farming activities with index score of more than 90.00 in Belgaum, 78.00 to 89.00 of index score in Dharwad and more than 70.00 of index score in Haveri district

Majority of the farming activities supervised by self or by family or by unpaid members with index score of 89.00 to 92.00 in all the districts.
Use of land resources noticed the index score of more than 70.00 in Dharwad and Belgaum districts and in Haveri it was 50.74. Adoption of organic farming was highest in Belgaum with the index score of 70.79 and in Dharwad and Haveri districts the index score of 56.00-58.00 was observed.

More than 90.00 percent of the women farmer followed selection of right crops in Dharwad and Belgaum districts. Highest percent of the farm women (91.10%) were using certified seeds in Belgaum district.

The women farmer of Belgaum district followed the organic farming practices in higher percentage followed by Dharwad district.

Women farmer in Belgaum district adopted higher percent of the integrated farming practices such as practicing and processing of vermicompost (70.00%), using vermicompost in field (64.44%) and maintaining dairy (56.67%).

More than half of the farm women from Dharwad, more than 70.00 percent and more than 40.00 percent of the farm women from Belgaum and Haveri districts were not following tillage practices and not using chemical fertilizer respectively. Majority of the farm women from Belgaum (90.50%) and Haveri (73.30%) districts were using pesticides.

Belgaum district adopted integrated nutrient management practices in higher percentage. This was followed by Dharwad and Haveri districts.

Selection of right season was adopted by higher percentage of women farmers in Belgaum (85.56%), Dharwad (75.56%) and Haveri (65.56%) districts. Using chemicals for control of insects (74.44%) and use of bird scares (70.00%) were adopted by women farmers in Belgaum district. Raising pest and disease resistant varieties were adopted by 60.00 and 50.00 percent of the farm women in Dharwad and Haveri districts respectively.
❖ In Belgaum district, 95.56 percent of the women farmers adopted all the agro forestry practices. In Dharwad district, growing trees on bunds and as wind brakes (57.78%) was adopted by highest percentage of women farmers.

❖ Rain water conservation was adopted by highest percent of women farmers in Belgaum (65.56%), Dharwad (47.78%) and Haveri (42.22%) districts.

❖ Agriculture was main source of income of all the selected families but the average annual income was highest in Belgaum (Rs.38939.02) followed by Dharwad (Rs. 29897.96) and Haveri (Rs. 27380.95) districts.

❖ In all the three selected districts such as Dharwad, Belgaum and Haveri, selected 270 women farmers practice agriculture. Out of 270 women farmers, 57 practice dairy and 16 sericulture. In all the three districts women farmers have adopted sustainable agricultural practices which have benefited to a greatest extent.

❖ More number of women farmers (90.00%) received organizational support by sometimes from agricultural university through training and technological support.

❖ More than 60.00 percent of the women farmers never received the support of agricultural university, BAIF and local NGO in Belgaum and Haveri districts.

❖ The highest organizational support was received from the department of agriculture in Belgaum district. Agricultural University and BAIF were the organizations supports the women farmers of Dharwad district.

❖ BAIF (90.00%) and Agricultural University (83.33%) trained the maximum percent of women farmers in Dharwad district.

❖ Highest percentage of women farmers in Belgaum (20.22%) and Dharwad (16.70%) districts adopted the technologies introduced by Agricultural University. In Belgaum district, 36.66 percent of the women farmers adopted the technologies introduced by department of agriculture.
Higher percentage of the respondents in Belgaum district told that confidence in sustainable agricultural practices (54.44%) and self interest in farming (38.89%) were the responsible factors for taking as farming system. More than 40.00 percent of the women farmers in Dharwad district also agreed the same factors in farming system. Where as in Haveri district, more than 30.00 percent of the respondents considered the self interest in farming (32.22%), confident of sustainable agricultural practices (31.11%) and no other economic alternatives (30.00%) were the factors responsible for taking as farming system.

More number of women respondents in Belgaum (71.11%), Haveri (67.78%) and Dharwad (64.44%) districts suggested hard work to become successful in sustainable agriculture.

The women farmers of Belgaum district faced lack of education as technical constraint by highest number of women farmers (88.90%). In Dharwad district, natural calamities and lack of technology as technical constraints faced by 50.00 and 30.00 percent of the women farmers respectively. In financial constraint, lack of loan was major constraint faced by 85.70 and 66.70 percent of the women farmers in Belgaum and Haveri districts respectively.

In Haveri district the selection of right crop for the right soil, rain water harvesting and growing trees in field bunds were suggested by 22.00 to 29.00 percent of the women farmers. In Belgaum district, 32.40 percent of the women farmers suggested selection of right crop for the right soil. Rain water harvesting as necessary practice by 33.33 percent of the farm women in Dharwad district.

Proper market information and training on new technologies were the technical guidance need by 81.11 and 63.33 percent of the women farmers in Dharwad and Belgaum districts respectively. More number of women farmers in Haveri district
need of technical guidance of water management (76.67%), organic farming (74.44%) and training on new technologies (71.11%).

- Highest number of women farmers in Belgaum (78.00 and 72.89 scores) and Dharwad (69.11 and 68.00 scores) districts have confidence and self esteem where as in Haveri it was recorded as 54.67 and 64.44 scores respectively. In the social empowerment category, more number of women farmers in Dharwad (67.11 score), Belgaum (64.67 score) and Haveri (48.67 score) districts have power to advice. Capacity building personality items such as training, enhance skill and knowledge gain on scientific agriculture were noticed the score of more than 60.00 by women farmers in Belgaum district and in Dharwad (scores of 61.33, 58.00 and 56.67) and Haveri (47.56, 50.67 and 47.56 scores) districts also the scores recorded by the women farmers in concerned to capacity building. In economic empowerment category, power to invest/ save and power to sale / purchase of produces were scored more by the women farmers of Belgaum (60.44 and 57.56 scores) followed by Dharwad (51.78 and 49.11 scores) and Haveri (37.78 and 32.89 scores) districts.

- The women farmers of Dharwad and Belgaum districts have moderate to high category of confidence and power to advice where as in Haveri district it was recorded as low to moderate category.

- Social empowerment was highly significant relationship with income and significant relationship with education but negatively related with age. Capacity building and enhanced role in agricultural decision making were highly significant relation with income, education and farming experience. Positive relationship was found between capacity building and age. Income, landholding and education were highly related with economical empowerment.
Organic farming was positively related with all the independent variables such as income, landholding, age, education and farming experience. Integrated farming was positively related with income, landholding, age and education. Land resources was found relationship with landholding, education and farming experience. Integrated nutrient management and integrated pest management were positively related with education and farming experience. Water conservation was significantly related with income, landholding, education and farming experience.

Organic farming, integrated farming, integrated nutrient management, integrated pest management and water conservation were significantly related with training undergone by the respondents but found non significant relationship with land resources, natural farming and agro forestry.
Conclusions from the Research Study:

From three Districts (Dharwad, Belgaum and Haveri) of Northern Karnataka 270 women farmers were selected for the research study. The important conclusions of the research findings are listed below:

- Variation was observed in adoption behaviour of women Farmers to sustainable practices due to agro climatic variation and personal aspects.
- All the women farmers have adopted most of the sustainable agricultural practices but varies between women farmers. Among the three districts selected for the study, women farmers of Belgaum district were better followed by Dharwad and Haveri.
- Integrated Farming, Natural Farming, Agro forestry and water conservation have been adopted by most of the women farmers.
- With further training on various aspects of sustainable agricultural practices they will be able to do better and increase their family income.
- Based on the research findings a module has been developed by the researcher on “Women Farmers in Sustainable Agricultural Practices”. In this module the adoption of sustainable agricultural practices and also thrust area of indicators with necessary source of information for their livelihood has been highlighted in the form of an attractive flow chart.