

**CULTIVATION OF VETIVER AS A
LEARNING PROCESS IN BORDER
PATROL POLICE SCHOOLS IN THE
REMOTE AREAS OF THAILAND**

BY

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ABSTRACT

THE DEVELOPMENT AND PROMOTION OF VETIVER UTILIZATION IN THAILAND WAS INITIATED BY HIS MAJESTY THE KING BHUMIBOL ADULYADEJ IN 1991. THE MOTIVATION WAS BORN OUT OF HIS ATTEMPT TO PRESERVED THAI SOIL RESOURCES BY MEANS OF SOIL CONSERVATION FOCUSING ON EROSION CONTROL AND PROTECTION. AS PART OF SUCH IMPLEMENTATION, HER ROYAL HIGHNESS PRINCESS MAHA CHAKRI SIRINDHORN HAS INTRODUCED VETIVER FOR GROWING IN POLICE BORDER PATROL POLICE SCHOOLS IN THE REMOTE AREAS SINCE 1992, COVERING AN AREA OF 300 HECTARES IN 178 SCHOOLS THROUGHOUT THE COUNTRY. ACTUALLY CULTIVATION OF VETIVER IN THE SCHOOLS HAS NOT ONLY TRIED TO TEACH THE STUDENTS HOW TO GROW BUT ALSO INCLUDE ALL PRACTICES AS LEARNING PROCESS FOR STUDENTS. THIS INVOLVES NUMBERS OF THE LESSONS BEGINNING WITH THE LESSONS ON CHARACTERISTICS OF VETIVER ECOTYPES, PROPAGATION AND CULTIVATION METHODOLOGY, ROLE OF VETIVER FOR SOIL AND WATER CONSERVATION AND COMMONLY ENDING WITH VALUES IN SOCIAL AND ENVIRONMENTAL ASPECTS. MOREOVER, IT HAS BEEN ALSO OBSERVED THAT THE STUDENTS HAVE OFTEN TAKEN PART IN PROMOTION AND EXTENSION OF VETIVER TO GROW ON THEIR PARENTS'

FARMS OR ON THE PUBLIC LAND OF THEIR VILLAGES. AT THE SAME TIME, HER ROYAL HIGHNESS PRINCESS MAHA CHAKRI SIRINDHORN HAS ALWAYS KEPT TRACT OF THE RESULTS AND PERIODICALLY ADDED MORE SUGGESTIONS TO MAKE THE SCHOOL VETIVER PROJECT SUCCESSFUL AND BENEFICIAL ONES. CONSEQUENTLY, NUMBERS OF THE POLICE BORDER PATROL SCHOOL HAVE RECEIVED THE NATIONAL AWARDS FOR OUTSTANDING CONTRIBUTION IN THE PROMOTION OF VETIVER GROWING IN THAILAND. THEREFORE, UNDOUBTEDLY THE VETIVER CULTIVATION PROJECTS IN THE POLICE BORDER PATROL SCHOOL HAVE BEEN PROVED OF SUCCESS WITH THE SMALL HANDS AND BY HEART OF THE YOUNG STUDENTS IN REMOTE AREAS.

1. INTRODUCTION

DURING A DINNER RECEPTION AT BHUBHING PALACE IN CHIANGMAI ON 19 FEBRUARY 1992, HIS MAJESTY KING BHUMIBOL ADULYADEJ OF THAILAND INSTRUCTED THE COMMISSIONER OF THE BORDER PATROL POLICE GENERAL HEADQUARTER THAT :

“PLANT VETIVER AT VARIOUS OPERATIONAL SITES UNDER THE SUPERVISION OF THE BORDER PATROL POLICE AND ALSO IN THE NEARBY VILLAGES, AND THEN TRY TO SPREAD THE CULTIVATION THROUGHOUT THE COUNTRY AS VETIVER HAS CHARACTERISTICS SUITABLE FOR THE SOIL CONSERVATION SYSTEM. THIS COULD BE DONE BY PLANTING IT AS A HEDGEROW ALONG THE CONTOUR. SUCCESSFUL RESULTS HAVE ALREADY BEEN OBTAINED FROM THE EXPERIMENTS CONDUCTED IN SEVERAL OTHER COUNTRIES IN ASIA. IT WAS ALSO FOUND THAT THE YIELD OF THE CROPS GROWN BETWEEN HEDGEROWS OF VETIVER HAD BEEN DRAMATICALLY INCREASED”.

FOLLOWING HIS MAJESTY’S SUGGESTION, MOST LANDS BELONGED TO BORDER PATROL POLICE

HEADQUARTER INCLUDING BORDER PATROL POLICE SCHOOLS IN THE REMOTE AREAS HAVE BEEN CULTIVATED TO VETIVER GRASS FOR THE PURPOSE OF SOIL AND WATER CONSERVATION. THESE ACTIVITIES HAVE BEEN STRONGLY SUPPORTED BY HER ROYAL HIGHNESS PRINCESS MAHA CHAKRI SIRINDHORN TO MAKE VETIVER GROWING PROJECT FOR THE BORDER PATROL POLICES POSSIBLE. MOREOVER, CULTIVATION OF THE VETIVER IN THE SCHOOLS HAVE ALSO INCLUDED AS PART OF THE MASTER PLAN OF THE SCHOOLS ON NATURAL RESOURCE CONSERVATION AND ENVIRONMENTAL PROTECTION SO THAT THE VETIVER PROJECT COULD BE EASILY IMPLEMENTED AND ALSO USED AS A LEARNING PROCESS FOR THE STUDENTS WHO PARTICIPATED IN THE PROJECT.

2. OBJECTIVES

THE VETIVER CULTIVATION IN THE BORDER PATROL POLICE SCHOOLS HAS BEEN IMPLEMENTED TO AIM AT THE FOLLOWING OBJECTIVES:

- 2.1) TO CULTIVATE VETIVER IN THE BORDER PATROL POLICE SCHOOLS FOR SOIL EROSION CONTROL AND PROTECTION.
- 2.2) TO MAKE DEMONSTRATION FOR CULTIVATION OF VETIVER BY MEANS OF STUDENT'S PARTICIPATION.
- 2.3) TO TEACH THE STUDENTS TO GROW AND TO MAKE THE STUDENTS RECOGNIZE THE ADVANTAGES OF VETIVER FOR SOIL AND WATER CONSERVATION.
- 2.4) TO EXTEND THE SCHOOL VETIVER PROJECT TOWARDS THE FARMING AREAS OF THE STUDENTS' PARENTS AND THE VILLAGE PUBLIC LANDS WHERE THE SOILS ARE PRONE TO EROSION.

3. CULTIVATION OF VETIVER IN THE SCHOOLS AS A SEQUENCE OF LEARNING PROCESS

SINCE THE VETIVER IS A KIND OF GRASS WHICH IN THAILAND, CAN BE FOUND GROWING IN MANY OPEN AREAS OF THE COUNTRY, THE STUDENTS IN BORDER PATROL POLICE SCHOOLS INITIALLY WERE HARD TO BELIEVE FOR ITS ADVANTAGES ON SOIL AND WATER CONSERVATION. THEREFORE, DURING THE FIRST PERIOD OF INTRODUCING VETIVER TO GROW IN THE SCHOOLS, THE TEACHER HAD TO WORK VERY HARD TO MAKE THE STUDENTS KNOW THE BENEFITS OF VETIVER FOR SOIL AND WATER CONSERVATION AS WELL AS FOR THE ENVIRONMENTAL PROTECTION. THE FOLLOWING ARE THE PROCEDURES TO MAKE THE SCHOOL STUDENTS PARTICIPATE IN THE VETIVER GROWING PROJECT IN SCHOOLS.

3.1 BASIC LEARNING UPON CHARACTERISTICS AND HABITATS OF VETIVER ECOTYPES.

DURING THE INITIAL STAGE OF INTRODUCING CULTIVATION OF VETIVER TO THE BORDER PATROL POLICE SCHOOLS, THE SCHOOL TEACHERS HAD TO ATTEND THE TRAINING COURSES ON VETIVER ORGANIZED BY THE OFFICE OF HRH PRINCESS MAHA CHAKRI SIRINDHORN'S PROJECT TO PROMOTE KNOWLEDGE AND ENHANCE UNDERSTANDING ON THE CULTIVATION AND USE OF VETIVER IN THE AREAS OF SCHOOL GARDEN, ROAD SIDE, BANK OF THE PONDS AND STREAM EDGES WITHIN THE VICINITY OF THE SCHOOL. AFTERWARD, ALL TEACHERS HAVE RECEIVED VETIVER SEEDLING OF DIFFERENT ECOTYPES NAMELY KAMPAENGPHEE 1 (*VETIVERIA NEMORALIS*) AND SRI LANKA (*VETIVERIA ZIZANIODES*) TO CULTIVATE IN THE SCHOOL GARDEN FOR THE PURPOSES OF DEMONSTRATION, TEACHING AND MULTIPLICATION.

AS PART OF THE LEARNING PROCESS, THE TEACHER USED THESE CULTIVATED VETIVER AS AN

EXAMPLE AND ALSO VARIOUS KINDS OF VISUAL-AID TO EXPLAIN THE STUDENTS ABOUT IT'S COMMON FEATURES NAMELY:

- MORPHOLOGICAL CHARACTERISTICS SUCH AS CROWN, LEAVES, STEMS, FLOWERS AND ROOTS

- PHYSIOLOGICAL CHARACTERISTICS SUCH AS INFLORESCENCE, SPIKELET, SEED AND SEEDLINGS

IT SHOULD BE ALSO NOTED THAT THE EMPHASIS WAS MADE PARTICULARLY TO SHOW HOW THE HUGE SPONGY MASS OF VETIVER ROOTS CAN HAVE SOIL EROSION-FIGHTING ABILITY AND THERE IS NO NEED TO WORRY ABOUT THEIR RAPID DISTRIBUTION AND TURNING INTO WEEDS BECAUSE OF THEIR LOW GERMINATION RATE.

IN ADDITION, SINCE VETIVER PLANT RARELY PRODUCES SEEDS, SOME PARTS OF VETIVER WERE ALSO USED FOR DESCRIBING HOW TO MAKE VETIVER PROPAGATION. THE MOST WELL-KNOWN VETIVER PART THAT CAN BE USED IN PROPAGATION INCLUDES THE TILLER WHICH IS A SHOOT SPROUTS FROM THE BASE OF THE STEM OF A VETIVER PLANT.

3.2 TEACHING OF COMMON TECHNIQUES USED IN VETIVER PROPAGATION.

AS A SEQUENCE OF LEARNING PROCESS, THE TEACHERS SHOWED THE STUDENTS HOW THE TILLER LOOKED LIKE AND WHAT TECHNIQUES COMMONLY EMPLOYED IN VETIVER PROPAGATION. FOR EXAMPLE, BARE-ROOT TILLER COULD BE PLANTED DIRECTLY TO THE SOIL OR TILLER COULD BE PLANTED IN SMALL POLY BAGS (ABOUT 5-10 CM. WIDE AND 15-25 CM. LONG) FOR ABOUT 45 DAYS AND THEN TRANSPLANT IT IN THE FIELD. IN THE CLASS, THE TEACHERS ALSO INSTRUCTED THE ADVANTAGES OF EACH PLANTING METHOD. FURTHERMORE, THE STUDENTS HADE TO PRACTICE HOW TO PLANT BARE-ROOT VETIVER IN THE FIELD, HOW TO PREPARE TILLER TO PUT IN A SMALL

POLYMER BAG AND HOW TO TAKE CARE IT IN THE NURSERY BEFORE TAKING IT TO PLANT IN THE FIELD.

3.3 CULTIVATION OF VETIVER IN THE SCHOOL FIELD.

CULTIVATION PRACTICE OF VETIVER IS ONE OF THE MOST IMPORTANT ACTIVITIES FOR VETIVER PROJECT IN THE SCHOOL. THE FOLLOWINGS ARE THE COMMON SEQUENCE OF VETIVER CULTIVATION IN THE SCHOOL.

3.3.1 SELECTION OF THE SUITABLE AREAS FOR VETIVER PLANTING.

AREAS TO BE SELECTED BY THE TEACHERS WERE IDENTIFIED AS FOLLOWS.

1) SLOPING AREAS THAT WERE ARE PRONE TO EROSION AND COMMONLY USED FOR CULTIVATION OF VEGETABLES AND FRUIT TREES AS BEING INCLUDED IN THE SCHOOL GARDENING PROGRAM. VETIVER HEDGEROWS WERE DESIGNATED ALONG THE CONTOUR LINE AND THE INTERVAL BETWEEN VETIVER HEDGEROWS WERE ABOUT 10-30 M. DEPENDING UPON THE SLOPE GRADIENT OF THE AREA.

2) AREAS AT THE EDGE OR BANK OF FARM POND AND RESERVOIR. AT LEAST, 2 ROWS OF VETIVER WERE PLANTED AROUND THE WATER BODY, THE FIRST ROW WAS LOCATED AT THE TOP OF BANK AND THE SECOND ROW WAS BELOW THE TOP ROW ABOUT 30-50 CM AND IT HAD TO BE JUST RIGHT ABOVE THE MAXIMUM LINE OF THE HIGHEST WATER LEVEL IN THE POND.

3) AREAS ALONG THE ROAD SIDE OR THE ROAD CUT IN THE SCHOOL. THE FIRST VETIVER HEDGEROW WAS NEAR THE TOP OF ROAD CUT AND THE SECOND ROW WAS BELOW THE TOP ONE ABOUT 30-50 CM. SUCH INTERVAL OF THE VETIVER HEDGEROWS WERE REPEATED DOWN SLOPE UNTIL REACHING THE BASE OF THE ROAD-CUT.

3.3.2 PLANTING TECHNIQUE.

AFTER LAYING OUT OF THE AREAS FOR PLANTING VETIVER AND VETIVER TILLERS HAD ALREADY BEEN PREPARED (MOSTLY TILLERS IN POLYMER BAGS), AS BEING INSTRUCTED BY THE TEACHERS, THE STUDENTS HAVE ALWAYS PARTICIPATED IN PLANTING VETIVER WHICH COMMONLY DONE BY THE TIME OF THE RAINY SEASON. PLATING TECHNIQUES WERE MADE BY THE FOLLOWING STEPS.

1) EACH PLANTING ROW WAS DUG BY THE HOE WITH A SPACE HOLLOWED OUT BIG ENOUGH TO FACILITATE TRANSPLANTING VETIVER FROM THE POLYMER BAG. BEFORE PLANTING, COMPOST WAS APPLIED AT THE BOTTOM OF PLANTING GROVE. AFTER TAKING OUT THE TILLER TOGETHER WITH THE PLANTING MEDIUM FROM THE POLYMER BAG, THE STUDENT TRANSPLANTED VETIVER TO THE SOIL AND PRESSED THE SOIL ALONG THE STRIP TIGHTLY. IF THE SOIL WAS NOT MOIST ENOUGH, WATERING THE VETIVER WAS NECESSARY, THUS EVERY PLANT STARTED TO GROW IMMEDIATELY AFTER PLANTING.

2) ABOUT 2-3 WEEKS AFTER PLANTING, CHECKED SURVIVAL RATE OF VETIVER AND RECORDED AS A PROCESS OF LEARNING. ALL DIED VETIVER HAD TO REPLANT AGAIN. GROWTH RATE OF VETIVER (HEIGHT AND TILLER NUMBER) IN THE FIELD WAS ALSO RECORDED BY THE STUDENT ONCE A MONTH IF POSSIBLE. IN ADDITION, WEEDING CONTROL NEEDED TO MAKE REGULARLY SO THAT THEY WOULD NOT DAMAGE THE VETIVER

3) AFTER RAINY SEASON, LEAVES AND CULMS OF VETIVER WOULD BE CUT OFF AT THE DISTANCE OF 20-40 CM. ABOVE GROUND LEVEL. SUCH PRACTICE WOULD ACCELERATE TILLERS TO REACH THE MAXIMUM GROWTH AGAIN WHEN THE NEXT RAINY SEASON CAME. THE VETIVER CULMS AND LEAVES COULD BE USED FOR MANY PURPOSE SUCH AS FOR

MULCHING, MAKING COMPOSE, USING FOR THATCHING AND, MAKING MANY KINDS OF HANDICRAFT LIKE HANDBAGS, HATS AND TOYS FOR CHILDREN.

4) VETIVER AT THE AGE OF ABOUT 4 YEARS-OLD NEEDED TO BE CUT LEAVES AND CULMS DOWN TO THE SOIL SURFACE BEFORE THE RAINY SEASON. ONCE WHEN THE RAIN CAME, NEW TILLERS WOULD SHOOT UP AND MADE THEM REGROW AGAIN.

5) AS A PART OF LEARNING PROCESS, THE TEACHERS WOULD TEACH THE STUDENTS TO OBSERVE HOW VETIVER GROW OR DIE, WHAT PROBLEMS DAMAGED VETIVER AND HOW VETIVER COULD PROTECT SOIL EROSION.

4. UTILIZATION OF VETIVER IN THE SCHOOLS

ALTHOUGH THE STUDENTS HAVE LEARNED AND MADE USE OF THE VETIVER FOR SOIL AND WATER CONSERVATION ESPECIALLY IN SLOPE AREAS, OTHER USES OF VETIVER WOULD BE RECOMMENDED TO THE STUDENTS BY THE TEACHERS. SUCH USES COULD ALSO ENCOURAGE THE PROMOTION OF VETIVER CULTIVATION IN THE FARM LANDS OUTSIDE THE SCHOOL IN TERMS OF CASH FOR THE GROWERS. MOST USES OF VETIVER CAN BE MADE FROM THE LEAVES AND CULMS OF VETIVER WHICH HAVE TO BE CUT OFF AS A COMMON PRACTICE FOR VETIVER GROWING. IN NORMAL SITUATION, HARVESTING OF LEAVES AND CULMS CAN BE DONE EVERY TWO TO THREE MONTHS DURING THE RAINY SEASON. ALSO, IT IS IMPERATIVE THAT LEAVES AND CULMS HAVE TO BE CUT OFF BEFORE ONSET OF DRY SEASON TO AVOID FIRE DAMAGE AND TO ACTIVATE THE PLANT TO RESUME GROWTH AGAIN IN THE NEXT RAINY SEASON

THE UTILIZATION OF DRY VETIVER LEAVES THAT THE STUDENTS COULD LEARN HOW TO MAKE THEM FROM THE TEACHERS WERE AS FOLLOWS:

- MAKING HANDICRAFT PRODUCTS LIKE HANDBAGS, HATS, BASKETS, DECORATING MATERIALS, MATS AND TOYS FOR CHILDREN.
- MAKING ROOF THATCHING
- OTHER RELATED AGRICULTURAL USES SUCH AS BEING USED FOR MULCHING, MAKING COMPOST AND MUSHROOM CULTURING.

IT IS INTERESTING IN NOTING THAT WHEN THE STUDENTS WORKED TOGETHER TO MAKE THOSE HANDICRAFT OR TO MAKE COMPOST, THESE COULD STRENGTHEN THE UNITY AND SHARING THE EXPERIENCE AMONG THE STUDENTS. MOREOVER, STUDENTS COULD SELL THOSE PRODUCTS FOR THEIR OWN BENEFITS AS WELL.

5 PROMOTION OF VETIVER CULTIVATION IN THE COMMUNITIES BY THE STUDENTS.

ONCE THE STUDENTS HAVE LEARNED TO GROW VETIVER IN THE SCHOOL AND HAVE RECOGNIZED THE ADVANTAGES OF VETIVER FOR SOIL AND WATER CONSERVATIONS AS WELL AS FOR ENVIRONMENTAL PROTECTION, THESE STUDENTS COULD TAKE PART IN PROMOTION OF THE VETIVER TO THEIR PARENTS' FARMS AND THE PUBLIC LANDS BELONGED TO THE COMMUNITIES. HOWEVER, TEACHERS NEEDED TO COOPERATE AND ADVISE THE STUDENT TO DISSEMINATE THE VETIVER SYSTEM TO THEIR PARENTS. THE COMMON PRACTICES THAT OFTEN MAKE THE CULTIVATION OF VETIVER TO THE COMMUNITIES POSSIBLE ARE AS FOLLOWS

5.1 TRANSFERRING THE KNOWLEDGE ABOUT VETIVER TECHNOLOGY BY THE STUDENTS TO THEIR PARENTS ONE BY ONE OR FACE TO FACE. THE AREAS IN THE SCHOOLS THAT HAVE BEEN CULTIVATED TO VETIVER COULD BE USED FOR DEMONSTRATION THE ADVANTAGES OF VETIVER IN TERM OF SOIL EROSION

CONTROL, WATER CONSERVATION, NATURAL REHABILITATION AND PROTECTION.

5.2 MAKING CLEAR TO THE FARMERS FOR THE LONG-TERM BENEFIT TO THE FARM LANDS AND PUBLIC LANDS THAT ARE SUBJECT TO SOIL EROSION AND NATURAL DISASTER.

5.3 IDENTIFYING THE BENEFIT OF BY-PRODUCTS OF THE VETIVER FOR EXAMPLE VETIVER LEAVES COULD BE USED FOR MAKING VARIOUS KINDS OF HANDICRAFTS AND FOR ROOF THATCHING.

5.4 IN ORDER TO MAKE THE CAMPAIGNS OF VETIVER PROMOTION MORE EFFICIENT, TRAINING COURSE OR SEMINAR HAD ALWAYS BEEN ARRANGED IN THE SCHOOL FROM TIME TO TIME. TEACHERS AND STUDENTS WHO PARTICIPATE THE VETIVER PROJECT SOLELY MANAGED THERE COURSE BY THEIR OWN.

6. SCHOOL VETIVER PROJECT MONITORING.

SINCE HIS MAJESTY KING BHUMIBOL ADULYADEJ OF THAILAND GAVE HIS INITIATIVE ABOUT THE VETIVER GRASS AND ADVISED THE COMMISSIONER OF THE BORDER PATROL POLICE GENERAL HEADQUARTER TO PLANT IT IN THEIR BASES AND TRY TO SPREAD THE CULTIVATION THROUGHOUT THE COUNTRY IN 1992, HER ROYAL HIGHNESS PRINCESS MAHA CHAKRI SIRINDHORN HAS ENCOURAGED TO GROW VETIVER IN BORDER PATROL POLICE SCHOOLS ALL OVER THE COUNTRY. TO FACILITATE VETIVER PROJECT IN THE SCHOOL, SHE INITIATED THAT SUCH A PROJECT INCLUDED AS A PART OF THE MASTER PLAN FOR NATURAL RESOURCE CONSERVATION AND ENVIRONMENTAL PROTECTION PROGRAM IN THE SCHOOLS. WITH HER CONCERN AND MOTIVATION, ALMOST ALL OF THE AGRICULTURAL LANDS, ROAD SIDE AND EDGE OF THE PONDS AND NATURAL WATERWAYS HAVE BEEN CULTIVATED TO VETIVER WITH DISTINCT MAINTENANCE AND WELL TAKING CARE. IT WAS

RECENTLY ESTIMATED THAT THE TOTAL AREAS OF 300 HECTARES IN 177 BORDER PATROL POLICE SCHOOLS HAVE BEEN CULTIVATED TO VETIVER OF SEVERAL ECOTYPES. IN ORDER TO ENCOURAGE VETIVER GROWING IN THE SCHOOLS TO REACH THE ULTIMATE GOAL, HER ROYAL HIGHNESS PRINCESS MAHA CHAKRI SIRINDHORN HAS ALWAYS KEPT TRACT OF THE RESULTS AND PERIODICALLY ADDED MORE COMMENTS OR SUGGESTIONS.

IT IS INTERESTING IN NOTING THAT VETIVER PROJECTS IN THE BORDER PATROL POLICE SCHOOLS HAVE BEEN RECOGNIZED TO A GREAT EXTENT BY THE PUBLIC ESPECIALLY BY THE THAILAND VETIVER NETWORK (THVN) THAT WAS ESTABLISHED BY THE OFFICE OF THE ROYAL DEVELOPMENT PROJECT BOARD (ORDPB). MOREOVER, IN RECOGNITION OF OUTSTANDING CONTRIBUTION IN VETIVER CULTIVATION AND PROMOTION, TWO BORDER PATROL POLICE SCHOOLS NAMELY CHANUTPIYAUEY SCHOOL AT PHOR SUBDISTRICT, VIENGLAEN DISTRICT, CHAINGRAI PROVINCE AND BAN MONG KAUW SCHOOL AT MAE CHAN SUBDISTRICT, UMPHANG DISTRICT, TAK PROVINCE HAVE RECEIVED MERIT AWARDS FROM PETROLEUM AUTHORITY OF THAILAND (PTT) IN 2008. THE PTT IS ONE OF THE NGO THAT STRONGLY SUPPORT VETIVER CULTIVATION AND PROMOTION IN THAILAND SINCE 2006. THEREFORE, THE VETIVER PROJECTS IN BORDER PATROL SCHOOLS AT LEAST HAVE BEEN PROVED OF SUCCESS TO SOME EXTENT.

7. CONCLUSION

SINCE THE DAY OF HIS MAJESTY THE KING OF THAILAND SUGGESTED THE BORDER PATROL POLICE BUREAU (BPPB) TO CULTIVATE VETIVER GRASS FOR THE PURPOSE OF SOIL AND WATER CONSERVATION, THE BPP HAS PROCEEDED IN VETIVER CULTIVATION UNTIL

NOW. AS PART OF SUCH IMPLEMENTATION, HER ROYAL HIGHNESS PRINCESS MAHA CHAKRI SIRINDHORN INTRODUCED THE VETIVER PROJECT TO THE BORDER PATROL POLICE SCHOOLS IN THE REMOTE AREAS SINCE 1992. WITH HER GREAT SUPPORT, TO DATE 178 BORDER PATROL POLICE SCHOOLS HAVE BEEN CULTIVATED TO VETIVER. THE TOTAL NUMBER OF VETIVER SO FAR PLANTED WAS ABOUT 16 MILLION, COVERING AN AREA OF 300 HA. IN TOTAL. THE ACTIVITIES IN THE SCHOOLS CONCERNING WITH VETIVER PROJECT INCLUDED NUMBER OF PRACTICES THAT BASICALLY FOLLOW THE PRINCIPLE OF "LEARNING BY DOING". IN THE CLASS, INITIALLY THE STUDENTS WOULD LEARN WHAT VETIVER LOOKED LIKE IN TERMS OF MORPHOLOGICAL AND PHYSIOLOGICAL CHARACTERISTICS, HOW THEY COULD CONSERVE SOILS AND WATER, AND HOW THEY PERFORM AGAINST SOIL EROSION AND PROTECT THE NATURAL ENVIRONMENT. AFTERWARDS, STUDENTS WOULD LEARN HOW TO MAKE PROPAGATION AND CULTIVATE VETIVER IN THE SCHOOLS' FIELDS. AS PART OF A LEARNING PROCESS, AFTER VETIVER GROWING UP, STUDENTS RECORDED THE PERFORMANCE OF THE VETIVER REGULARLY. MAINTENANCE OF VETIVER AFTER PLANTING WAS TOTALLY DONE BY THE STUDENTS UNDER THE ADVISORY OF THE TEACHERS WHO RESPONSIBLE FOR THE PROJECT. FURTHERMORE, THE ALTERNATIVE USES OF THE VETIVER FROM THE LEAVES AND CALMS THAT HAVE TO BE CUT OFF PERIODICALLY WERE ALSO INSTRUCTED IN THE SCHOOLS. THESE INCLUDED THE PRODUCTION OF VARIOUS HANDICRAFTS SUCH AS HANDBAGS, BASKET, HATS, DECORATING MATERIALS AND ROOF THATCHING. IN ADDITION, THEY COULD ALSO USED FOR MAKING COMPOSE AND MULCHING. EXTENSION AND PROMOTION OF VETIVER TO THE FARMS OF STUDENTS' PARENTS AND TO THE PUBLIC LANDS OF

THE COMMUNITIES WERE ALSO IMPLEMENTED TO A CERTAIN EXTENT BY THE STUDENTS AND THE SCHOOL TEACHERS. IT APPEARS THAT THIS KIND OF TRANSFER PROCESS WAS RELATIVELY APPROPRIATED AND THE FARMERS IN MANY CASES ADOPTED THE KNOW-HOW TO CULTIVATE VETIVER ON THEIR FARMLANDS.

APPARENTLY, VETIVER PROJECT IN THE BORDER PATROL POLICE SCHOOLS APPEARS TO BE RELATIVELY SUCCESSFUL, OF COURSE WITH THE SMALL HANDS AND BY HEART OF THE YOUNG STUDENTS. THIS IS BECAUSE OF THE GREAT SUPPORT BY HER ROYAL HIGHNESS PRINCESS MAHA CHAKRI SIRINDHORN WHO INTRODUCED VETIVER PROJECT TO CULTIVATE IN THE FIELD OF BORDER PATROL POLICE SCHOOL SINCE 1992. AT THE SAME TIME, HER ROYAL HIGHNESS HAS ALWAYS KEPT TRACT OF THE RESULT TO MAKE THE VETIVER PROJECT SUCCESSFUL. AS THE SEQUENCE, SOME OF THESE SCHOOLS NAMELY CHANUTPIYAUEY SCHOOL AND BAN MONG KAUW SCHOOLS IN NORTHERN THAILAND HAVE RECEIVED MERIT AWARDS FROM THE PETROLEUM AUTHORITY OF THAILAND FOR THE RECOGNITION OF OUTSTANDING CONTRIBUTION IN VETIVER CULTIVATION AND PROMOTION.

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FIG.1 LEARNING MORPHOLOGICAL CHARACTERISTICS OF VETIVER IN THE CLASS.



FIG.2 PREPARATION OF THE VETIVER TILLERS FOR PLANTING IN THE SCHOOL.



FIG.3 PLANTING VETIVER IN THE SCHOOL FIELD.



FIG.4 PLANTING VETIVER ALONG THE ROAD SIDE IN THE VILLAGE





FIG.7 DEMONSTRATION OF VETIVER PLANTING MADE BY HRH PRINCESS MAHA CHAKRI SIRINDHORN



FIG.8 VETIVER HEDGEROWS PLANTED ALONG THE ROADSIDE



FIG.9 USE OF VETIVER FOR MULCHING.



FIG.10 USE OF VETIVER FOR MAKING COMPOST.



FIG.11 STUDENTS PRACTICED HOW TO MAKE ROOF THATCHING.



FIG.12 USE OF VETIVER THATCHING FOR ROOFING.

